
External Radio & APS-3

User Guide

Revision 1.01

Radio Configuration Manual

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1 Introduction

1.1 Scope

The purpose of this document is to provide step-by-step procedures for configuration and upgrading specific UHF radios for use with an APS-3. The model name of the external UHF radios used in this document are; AW400Tx, AW435, and Pacific Crest PDL. These radios will be configured using the vendor supplied software and with SurvCE.

1.2 Revision History

Rev 1.00 (March 2009)	Initial Release
Rev 1.01 (June 2009)	Subsequent Release

1.3 Customer Service and Support

For any problems or questions, contact ALTUS Positioning Systems support.

support@altus-ps.com

<http://www.altus-ps.com/support> or write to

ALTUS Positioning Systems
20725 Western Avenue, Suite 100
Torrance, CA 90501
(310) 541-8139 office
(310) 541-8257 fax

1.4 Required Equipment

- APS-3 with fully charged batteries or 12 VDC/2 A power supply + Altus External Power Cable, P/N 10031
- Altus Controller Cable P/N 10029
- Data Collector (Allegro CX, Allegro MX, Archer, Surveyor+)
- PC with Windows 2000, Windows XP, or Windows Vista Operating System
- AWLaunch radio configuration program (from Altus) v1R22 or higher
- AW400Tx firmware Flash file rev xx(from Altus)
- AW435 External Radio & firmware rev.xx
- Pacific Crest PDL External Radio & PDLCONF software
- 12 Volts – 35 Ampere-Hour Capacity @ 20-Hour Rate Battery



Contact Carlson Software for SurvCE warranty and Juniper Systems for Allegro CX/MX & Archer warranty.

1.4.1 Ports

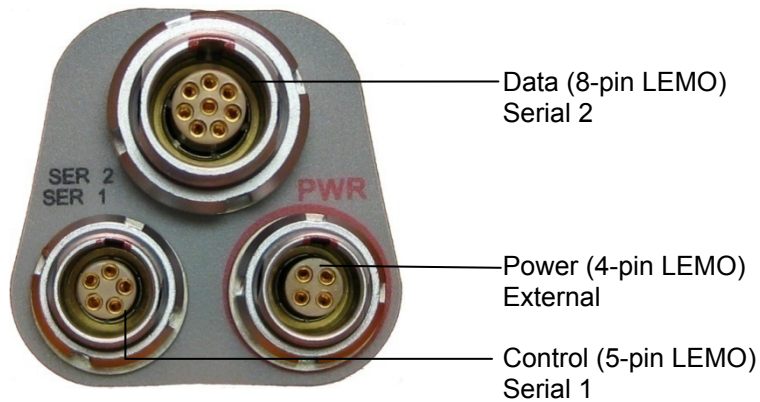


Figure 1: Ports Description

Table 1: Lemo Cable Description

LEMO	Description	What to use it for
8pin	Data	External Radio
5pin	Control	Controller or Computer
4pin	Power	External Power

1.4.2 APS-3 Power Input

The external power input is via the 4-pin Lemo connector. The specifications are:

Power Consumption: 3.6W Typical

External Power: +9VDC to +15VDC

Current: 300mA @ 12V DC Nominal

Table 2: Power Cable Description

Wire Color	Function
RED	Power (+)
BLACK	Ground (-)
GREEN	Reserved
WHITE	Reserved

2 AW435

2.1 AW435 AWLaunch Configuration

2.1.1 Configuration to Transmit

- 2.1.1.1 Power the AW435 external radio.
- 2.1.1.2 Connect CM 10001 cable from the radio to the PC.
- 2.1.1.3 Start the AWLaunch program.

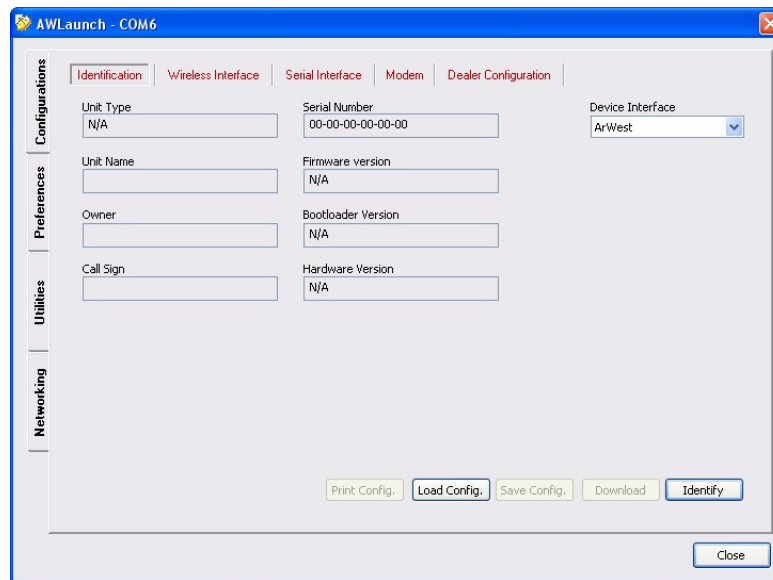


Figure 2: AWLaunch Startup

- 2.1.1.4 If not already selected, choose *ArWest* under the Device Interface pull down menu.

2.1.1.5 Click the *Preferences* tab, and select the Com Port of the computer the AW435 is connected to, and select 115200 for the Baud Rate.

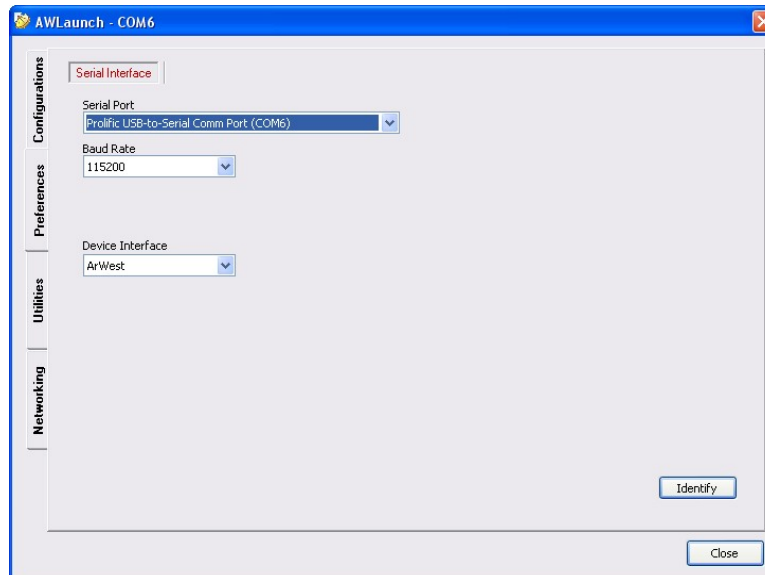


Figure 3: Preferences

2.1.1.6 Click the *Configuration* tab, and then select *Identify* to initiate communication with the AW435.

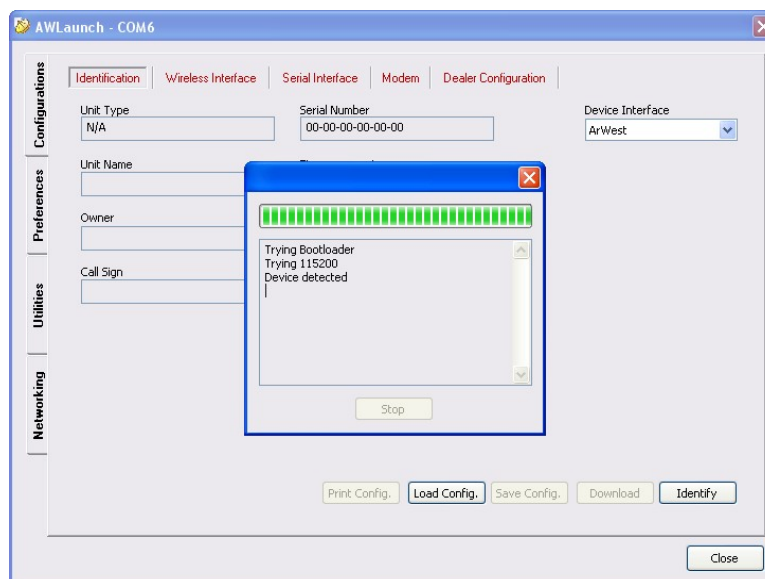


Figure 4: Identify Progress Bar

2.1.1.7 A successful connection will display fields (if applicable) for the Unit Type, Unit Name, Owner, Call Sign, Serial Number, Firmware Version, Bootloader Version, and Hardware Version.

The screenshot shows the 'AWLaunch - COM6 (00-00-00-00-39-30)' window with the 'Identification' tab selected. The left sidebar contains 'Configurations', 'Preferences', 'Utilities', and 'Networking'. The main area displays the following fields:

Field	Value
Unit Type	AW435
Serial Number	00-00-00-00-39-30
Device Interface	ArWest
Unit Name	
Firmware version	Ver. 1.6 Rev 11
Owner	
Bootloader Version	Ver. 1.2 Rev B
Call Sign	
Hardware Version	Ver. 1.2

At the bottom, there are buttons for 'Print Config.', 'Load Config.', 'Save Config.', 'Download', 'Identify', and a 'Close' button at the bottom right.

Figure 5: Identification menu

2.1.1.8 Click on the Wireless Interface, and select the appropriate radio settings to transmit to the APS-3; Protocol/Base Simplex Transmitter, RF Channel/Manual Frequency Channel, Modulation/ DQPSK 19.2 kbps, RF Power/ 320 mW – 35 W, Misc/ Scrambling disabled & FEC enabled.

The screenshot shows the 'AWLaunch - COM6 (00-00-00-00-39-30)' window with the 'Wireless Interface' tab selected. The left sidebar contains 'Configurations', 'Preferences', 'Utilities', and 'Networking'. The main area displays the following settings:

Section	Setting	Value
Protocol	Base	☒
	Remote	☐
Modulation	Modulation	DQPSK
RF Channel	Frequency Channel	(1) - 459,550,000
RF Power	RF Power	25
Misc	Scrambling	☐
Misc	FEC	☒

At the bottom, there are buttons for 'Print Config.', 'Load Config.', 'Save Config.', 'Download', 'Identify', and a 'Close' button at the bottom right.

Figure 6: Wireless Interface

2.1.1.9 Click on the *Serial Interface* tab, and ensure the Serial connection is set as shown below.

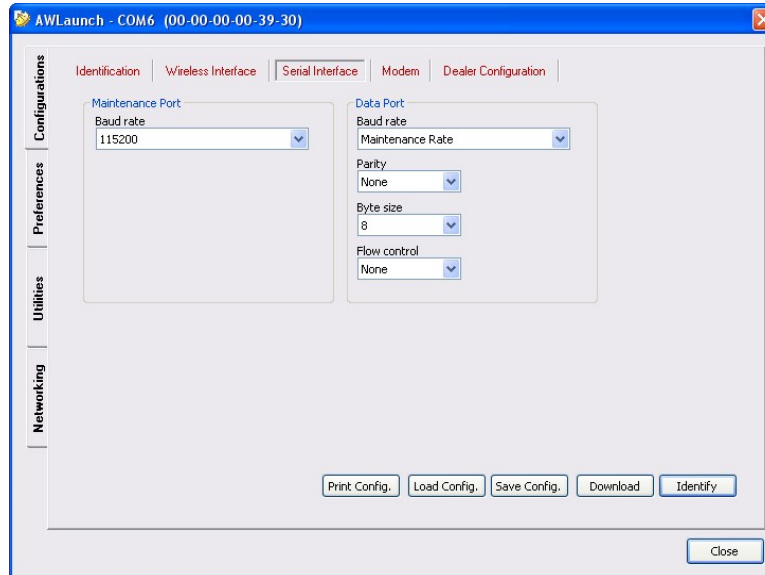


Figure 7: Serial Interface

2.1.1.10 Click on the *Modem* tab, and ensure all settings are disabled as shown below.

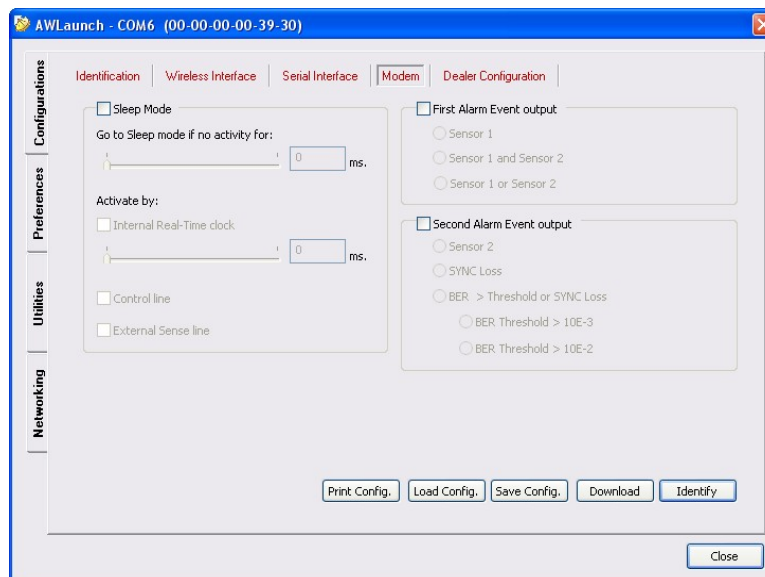


Figure 8: Modem

2.1.1.11 Click on the *Dealer Configuration*, and ensure the options are set as shown below.

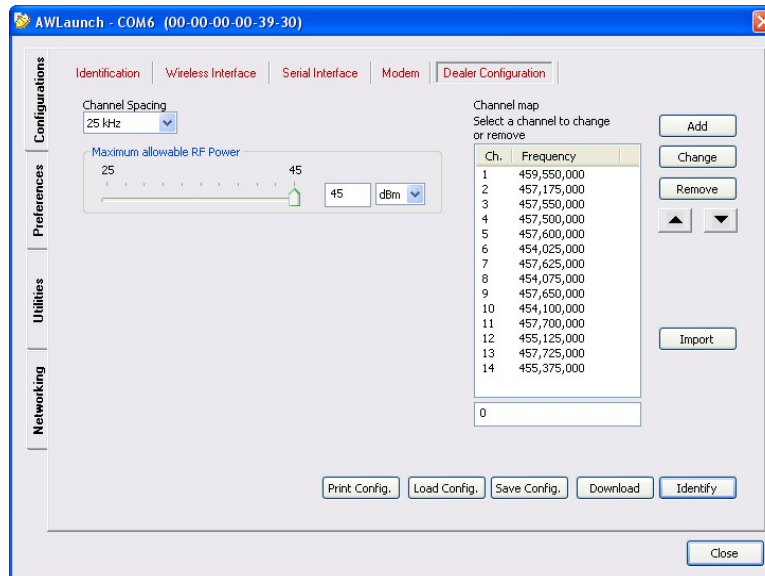


Figure 9: Dealer Configuration

2.1.1.12 Set the Channel, frequency, RF Power and Channel spacing in this menu. Changes to these settings must match between the base and the rover. Click the Download button to store the new settings into the radio.

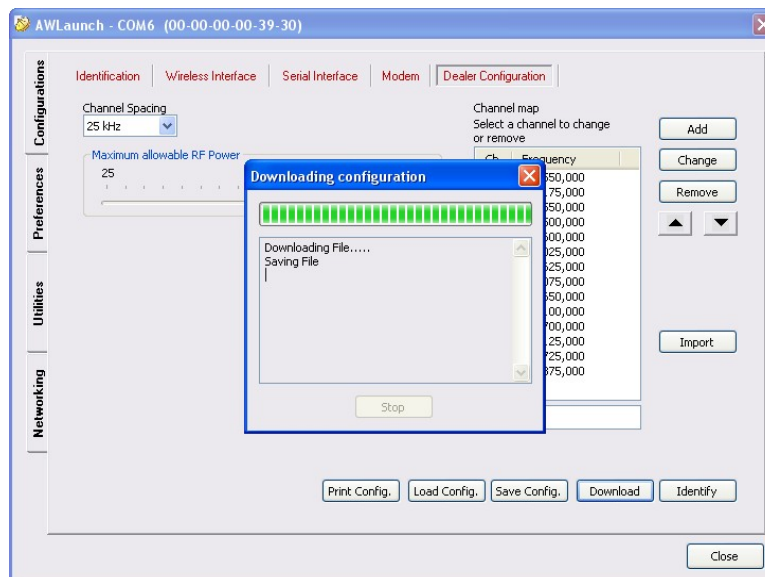


Figure 10: Programming Progress Bar

2.1.1.13 Configuring the AW435 radio is complete, select *Close* to disconnect the AW435.

2.1.2 Configuration to Receive

The AW435 external radio can be configured to receive by following the steps described below.

- 2.1.2.1 Power the AW435 external radio.
- 2.1.2.2 Connect CM 10001 cable from the radio to the PC.
- 2.1.2.3 Start the AWLaunch program.

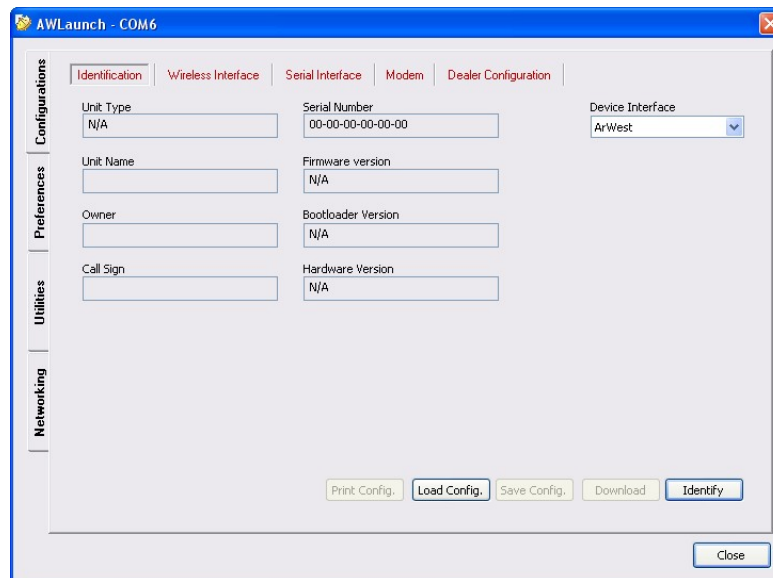


Figure 11: AWLaunch Startup Page

- 2.1.2.4 If not already selected, choose *ArWest* under the Device Interface pull down menu.

2.1.2.5 Click the *Preferences* tab, and select the Com Port of the computer the AW435 is connected to, and select 115200 for the Baud Rate.

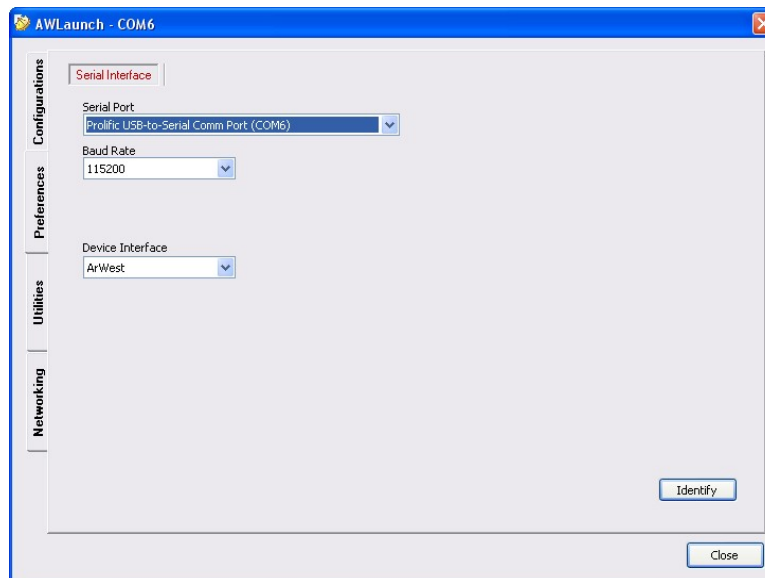


Figure 12: Preferences

2.1.2.6 Click the *Configuration* tab, and then select *Identify* to initiate communication with the AW435.

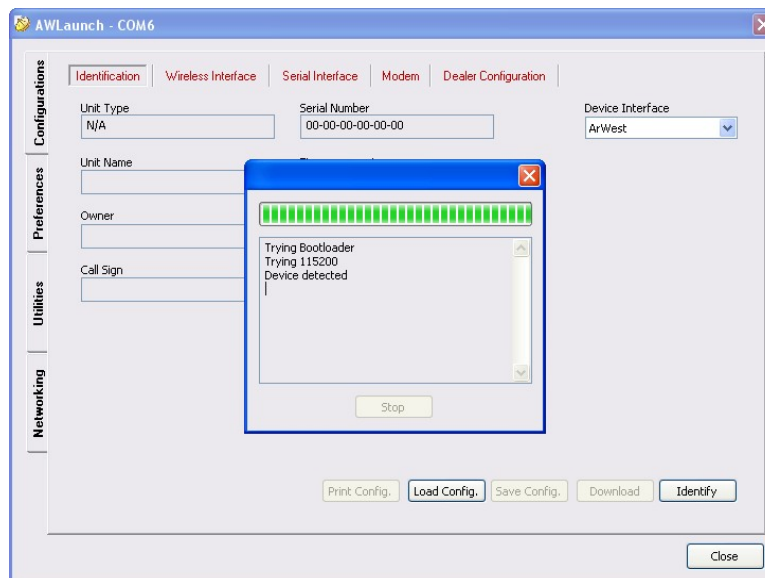


Figure 13: Identification Progress Bar

2.1.2.7 A successful connection will display fields (if applicable) for the Unit Type, Unit Name, Owner, Call Sign, Serial Number, Firmware Version, Bootloader Version, and Hardware Version.

The screenshot shows the 'AWLaunch - COM6 (00-00-00-00-39-30)' window with the 'Identification' tab selected. The left sidebar contains 'Configurations', 'Preferences', 'Utilities', and 'Networking'. The main area displays the following fields:

Field	Value
Unit Type	AW435
Serial Number	00-00-00-00-39-30
Device Interface	ArWest
Unit Name	
Firmware version	Ver. 1.6 Rev 11
Owner	
Bootloader Version	Ver. 1.2 Rev B
Call Sign	
Hardware Version	Ver. 1.2

At the bottom, there are buttons for 'Print Config.', 'Load Config.', 'Save Config.', 'Download', 'Identify', and a 'Close' button at the very bottom right.

Figure 14: Identification

2.1.2.8 Click on the Wireless Interface, and select the appropriate radio settings to receive; Protocol/Base Simplex Receiver, RF Channel/Manual Frequency Channel, Modulation/ DQPSK 19.2 kbps, RF Power/Disabled, Misc/ Scrambling disabled & FEC enabled.

The screenshot shows the 'AWLaunch - COM6 (00-00-00-00-39-30)' window with the 'Wireless Interface' tab selected. The left sidebar is the same as in Figure 14. The main area displays the following settings:

Section	Setting
Protocol	Base (radio button), Remote (radio button)
Modulation	DQPSK, 19.2 kbps
RF Channel	Automatic Scanning (radio button), Manual (radio button), Frequency Channel (2) - 457,175,000
RF Power	25 to 45 dBm, 45 dBm selected
Misc	Scrambling (checkbox), FEC (checkbox), Link Id (0)

At the bottom, there are buttons for 'Print Config.', 'Load Config.', 'Save Config.', 'Download', 'Identify', and a 'Close' button at the very bottom right.

Figure 15: Wireless Interface

2.1.2.9 Click on the *Serial Interface* tab, and ensure the Serial connection is set as shown below.

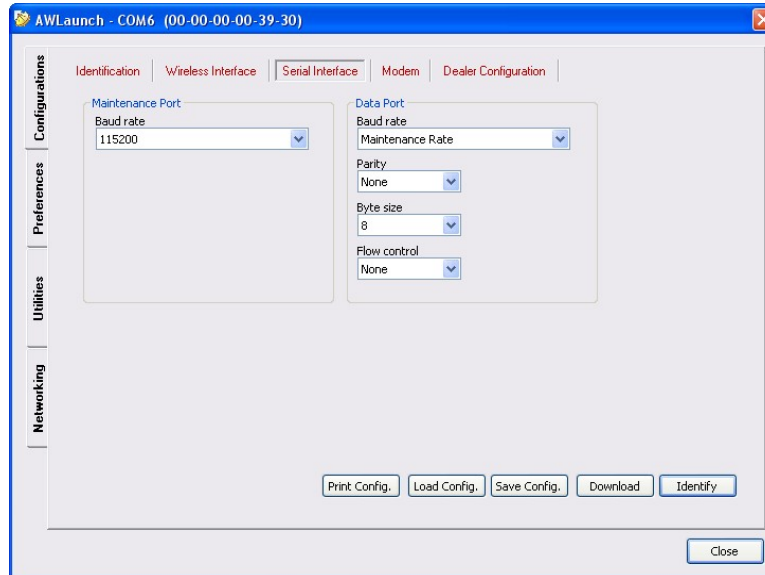


Figure 16: Serial Interface

2.1.2.10 Click on the *Modem* tab, and ensure all settings are disabled as shown below.

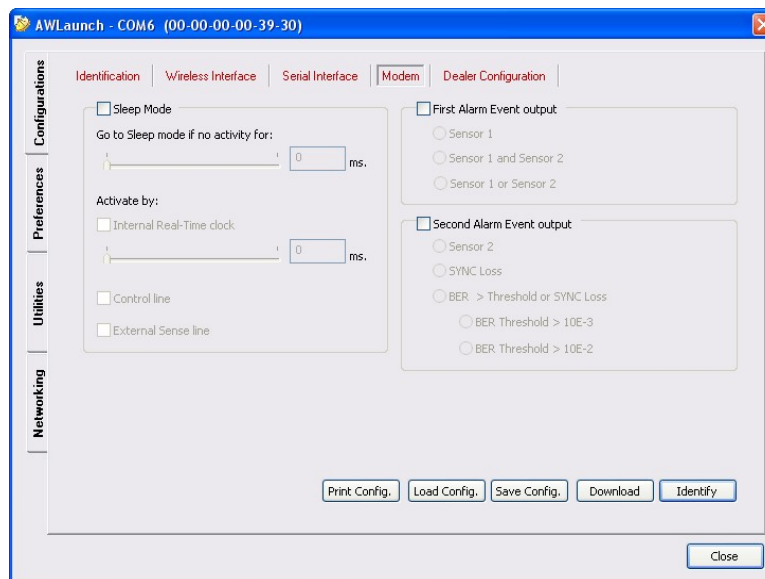


Figure 17: Modem

2.1.2.11 Click on the *Dealer Configuration*, and ensure the options are set as shown below.

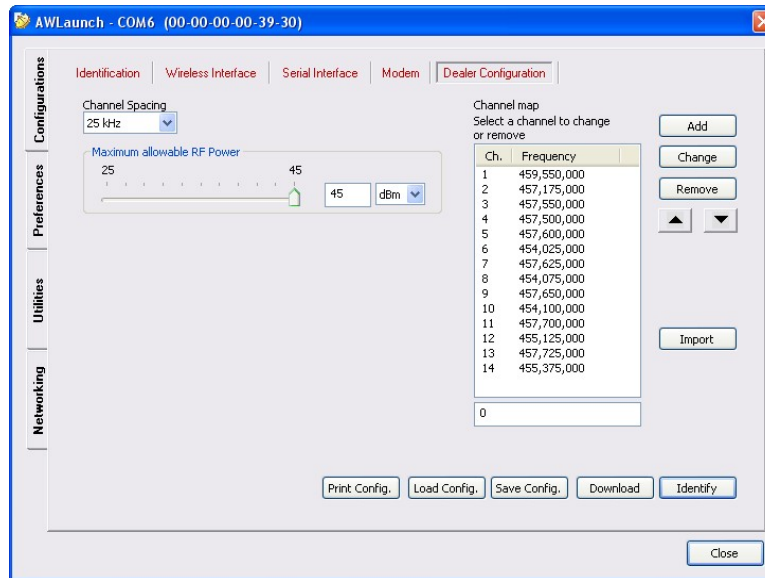


Figure 18: Dealer Configuration

2.1.2.12 Set the Channel, frequency, RF Power and Channel spacing in this menu. Changes to these settings must match between the base and the rover. Click the Download button to store the new settings into the radio.

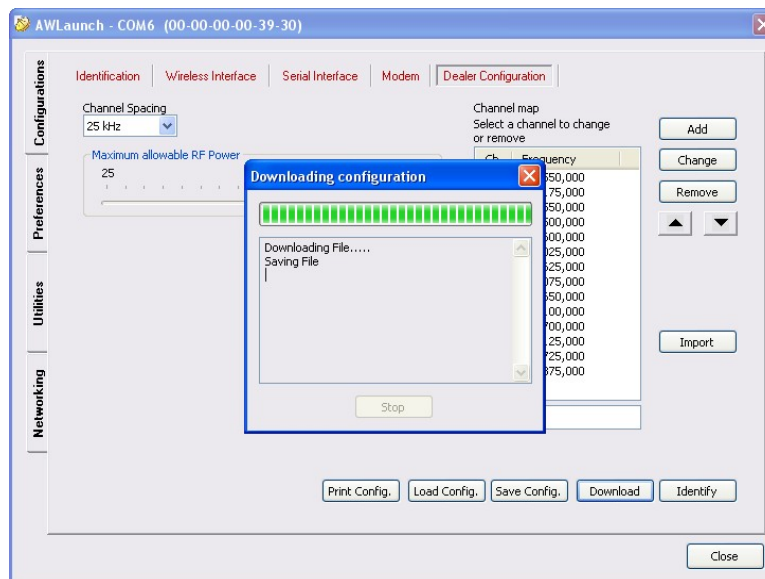


Figure 19: Programming Progress Bar

2.1.2.13 Configuring the AW435 radio is complete, select *C/ose* to disconnect the AW435.

2.1.3 Aw435 Firmware Upgrade

2.1.3.1 Click the Utilities tab along the left edge of the GUI once the Identify process is complete.

2.1.3.2 Click the Browse button  to the right of the GUI.

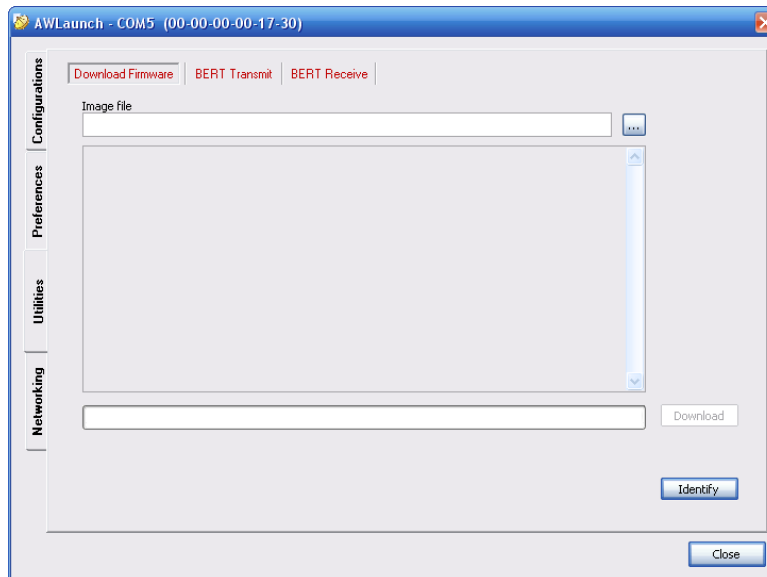


Figure 20: Download Firmware

2.1.3.3 Browse to the location where the AW435/AW400TX firmware file is saved, choose the appropriate file, and click Open.

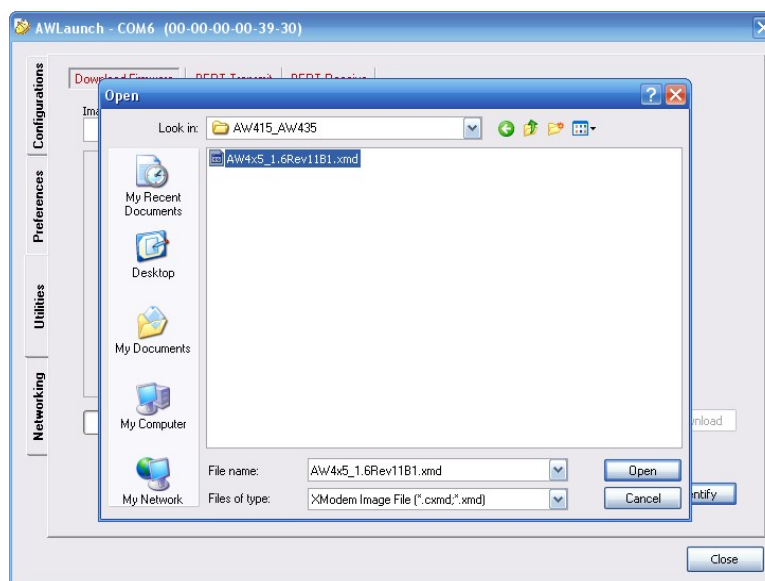


Figure 21: Firmware File Selection

2.1.3.4 Click the Download button, which will change to a Stop button, and the download process will begin.

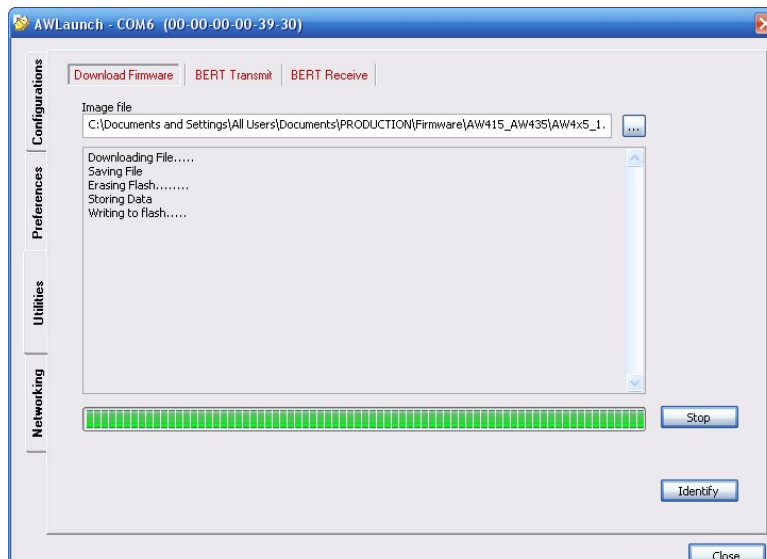


Figure 22: Downloading Firmware

2.1.3.5 Once the download is complete, a dialog indicating a successful operation will be displayed, then click OK to close dialog.

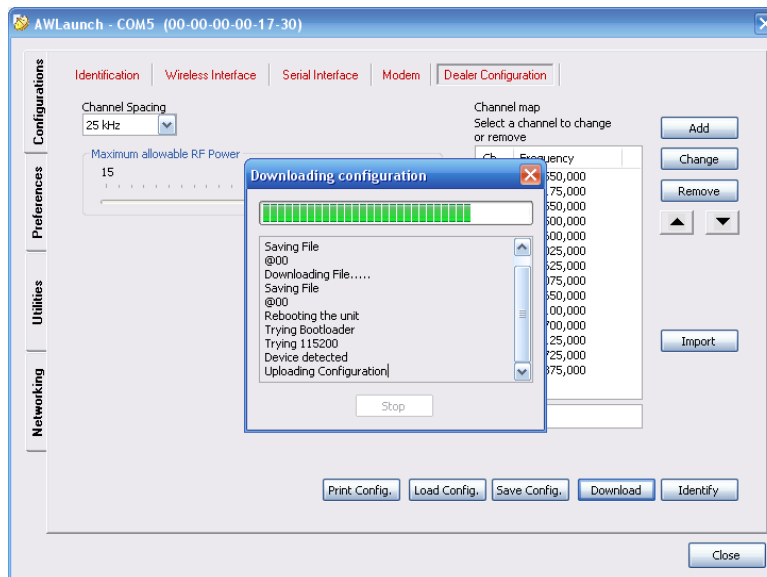


Figure 23: Successful Firmware Upgrade

2.1.3.6 If there are no other changes required, click the Close button to disconnect from the AW435.

2.1.4 AW435 Repeater

- 2.1.4.1 Power the AW435 external radio.
- 2.1.4.2 Connect CM 10001 cable from the radio to the PC.
- 2.1.4.3 Start the AWLaunch program.

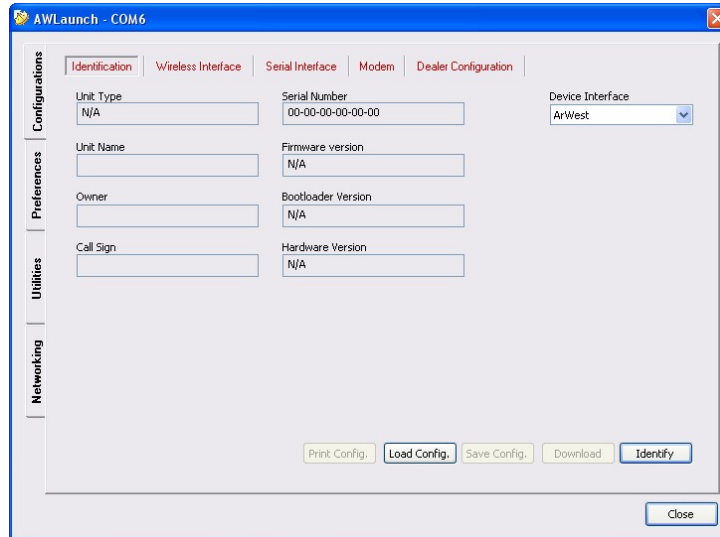


Figure 24: AWLaunch Startup

- 2.1.4.4 If not already selected, choose *ArWest* under the Device Interface pull down menu.
- 2.1.4.5 Click the *Preferences* tab, and select the Com Port of the computer the AW435 is connected to, and select 115200 for the Baud Rate.

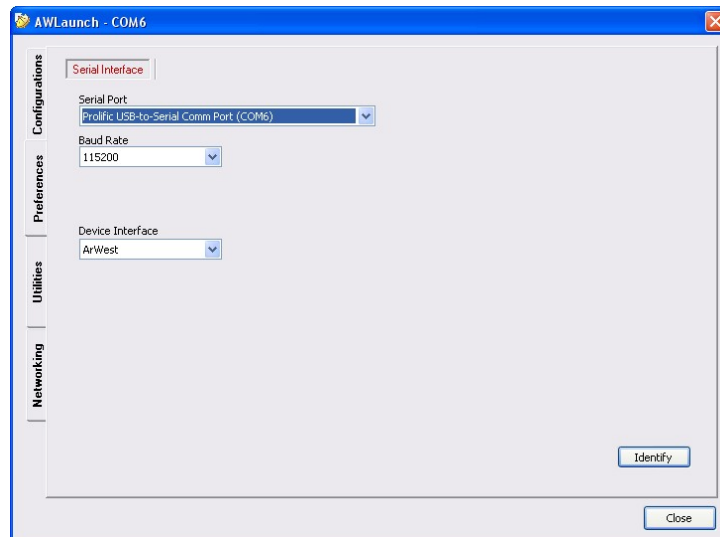


Figure 25: Preferences

2.1.4.6 Click the *Configuration* tab, and then select *Identify* to initiate communication with the AW435.

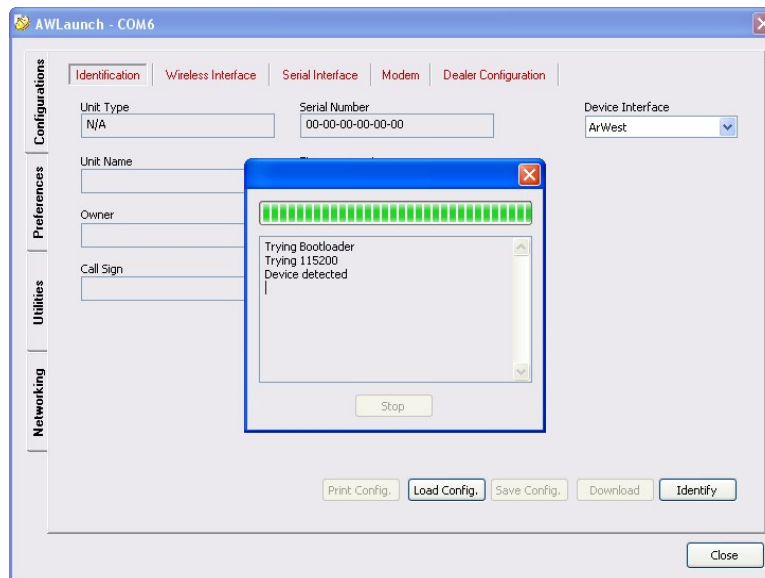


Figure 26: Identify Progress Bar

2.1.4.7 A successful connection will display fields (if applicable) for the Unit Type, Unit Name, Owner, Call Sign, Serial Number, Firmware Version, Bootloader Version, and Hardware Version.

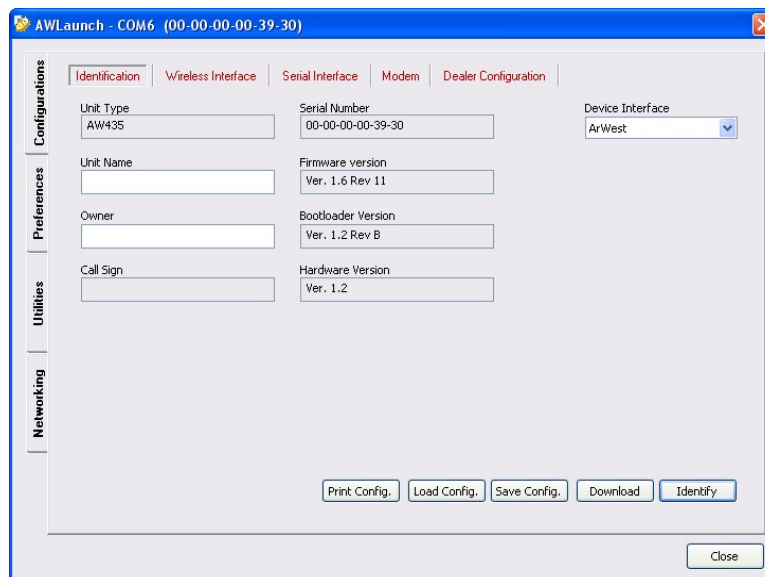


Figure 27: Identification menu

2.1.4.8 Click on the Wireless Interface, and select the appropriate radio settings to transmit to the APS-3; Protocol/Remote Repeater, RF Channel/Manual Frequency Channel, Modulation/ DQPSK 19.2 kbps, RF Power/ 320 mW – 35 W, Misc/ Scrambling disabled & FEC enabled.

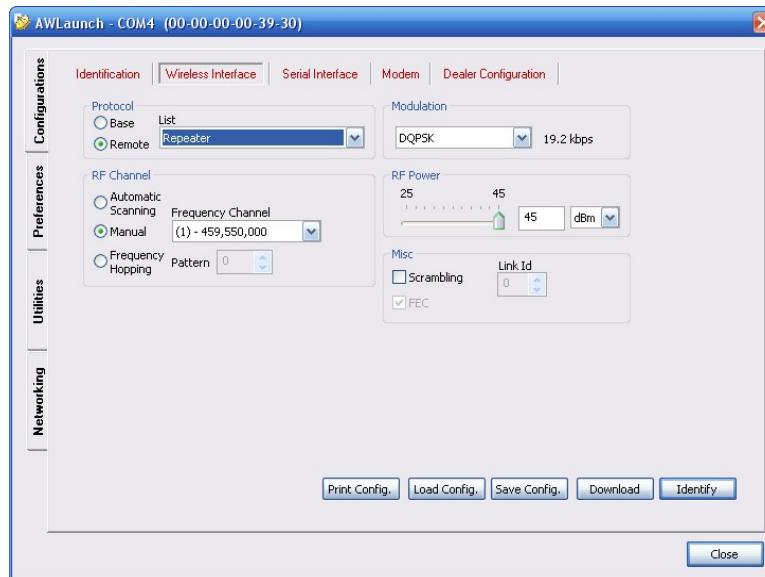


Figure 28: Wireless Interface

2.1.4.9 Click on the *Serial Interface* tab, and ensure the Serial connection is set as shown below.

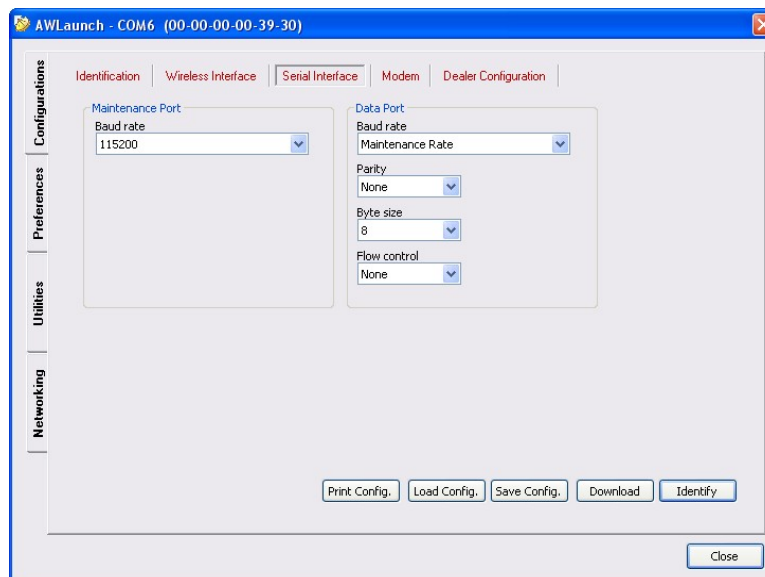


Figure 29: Serial Interface

2.1.4.10 Click on the *Modem* tab, and ensure all settings are disabled as shown below.

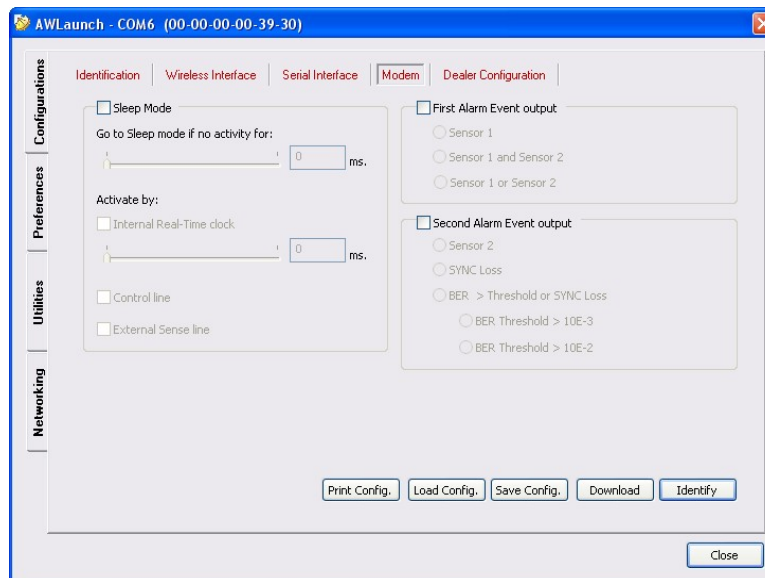


Figure 30: Modem

2.1.4.11 Click on the *Dealer Configuration*, and ensure the options are set as shown below.

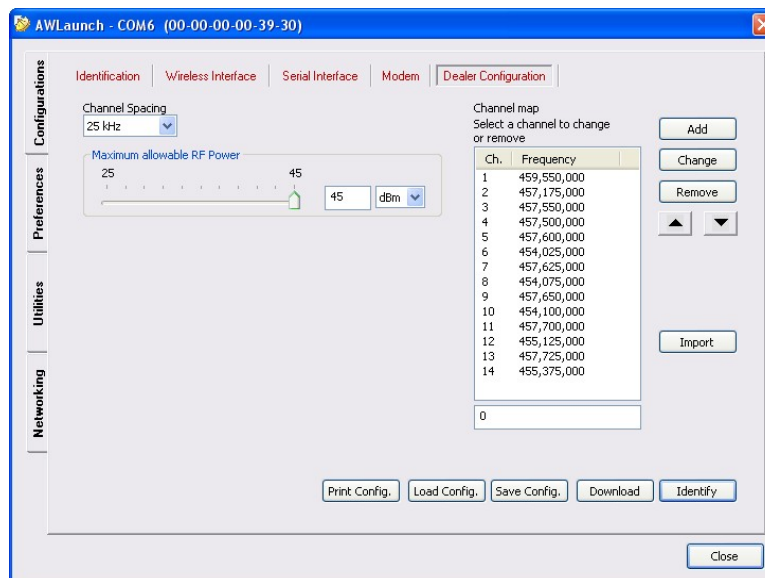


Figure 31: Dealer Configuration

2.1.4.12 Set the Channel, frequency, RF Power and Channel spacing in this menu. Changes to these settings must match between the base and the rover. Click the Download button to store the new settings into the radio.

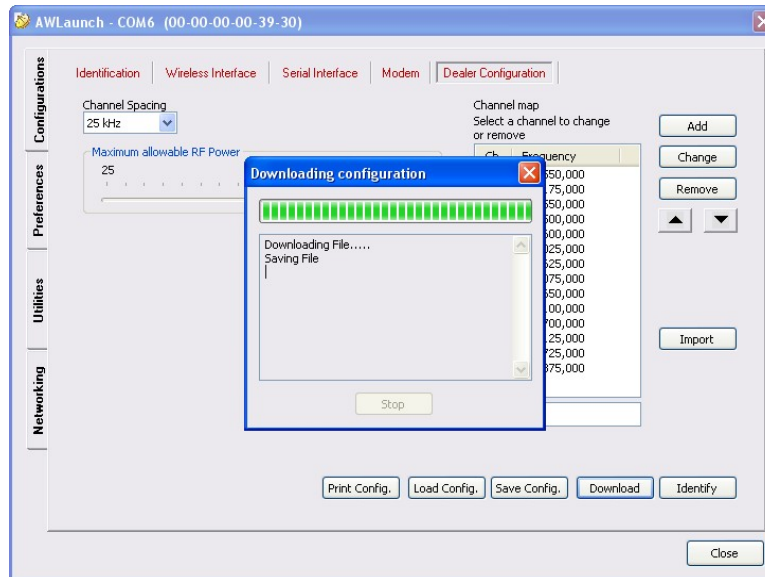


Figure 32: Programming Progress Bar

2.1.4.13 Configuring the AW435 radio is complete, select *Close* to disconnect the AW435.

2.2 AW435 SurvCE Configuration

2.2.1 Configuration to Transmit

An external radio or external modem can be used to output corrections to the APS-3. This is done by configure an external radio/modem as illustrated below.

2.2.1.1 Start SurvCE → Select Equip tab → Select GPS Base → Select RTK tab

2.2.1.2 In the RTK tab, select ARWest from the Device menu.

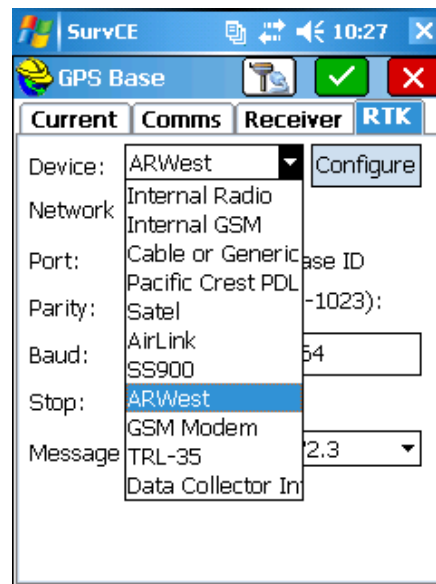


Figure 33: RTK Tab

2.2.1.3 In the Baud menu select 115200.

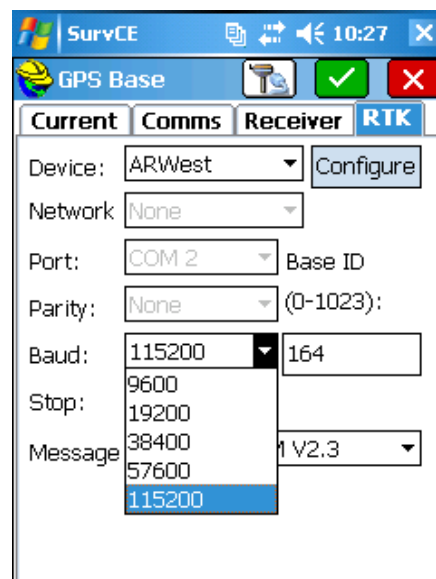


Figure 34: Baud Rate Selection

2.2.1.4 Select the message type of the corrections desired.

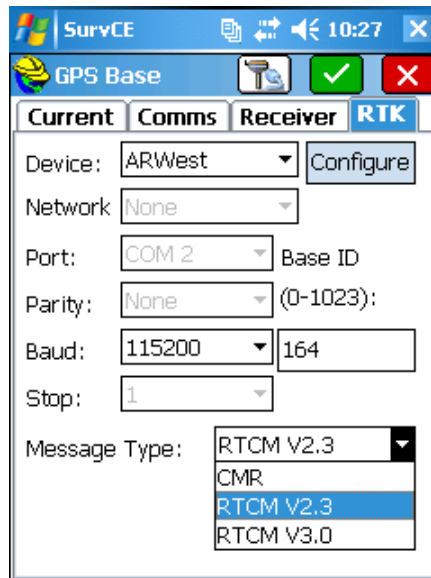


Figure 35: Message Type Menu

2.2.1.5 Select the Configure button to continue APS-3/external base configuration.

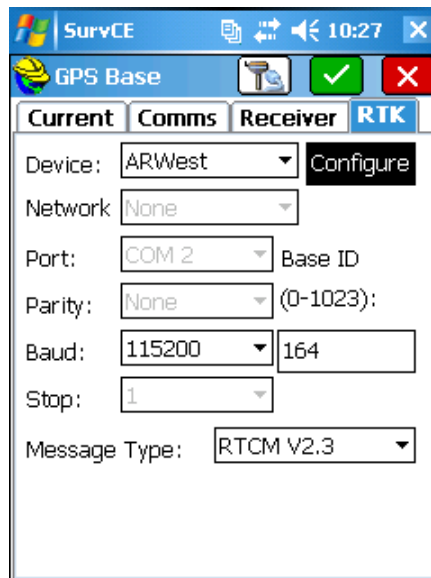


Figure 36: Configure External Base

2.2.1.6 Select Protocol/Simplex.

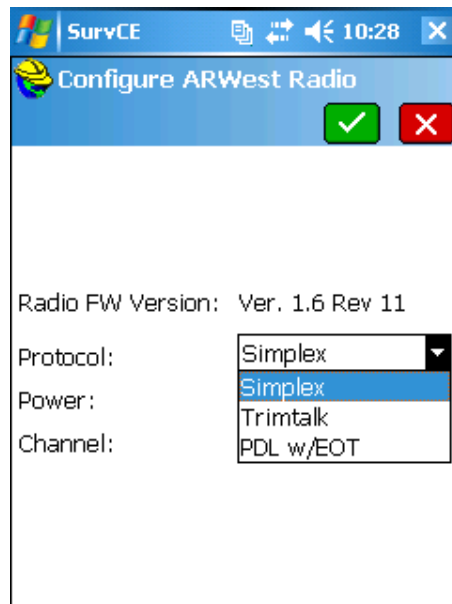


Figure 37: External Radio Protocol Menu

2.2.1.7 Select a Power value between 25 db (~320 mW) and 45 db (35 Watts).

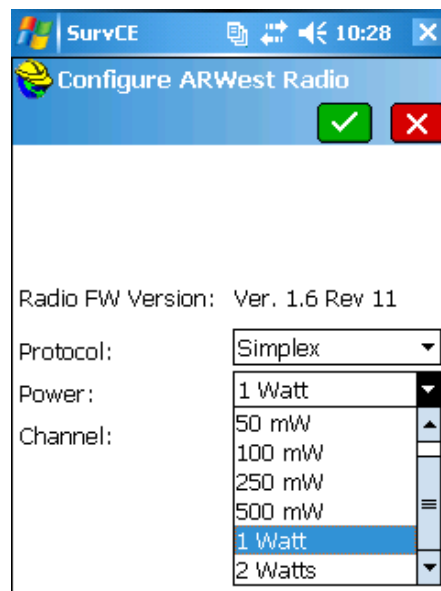


Figure 38: External Radio Power Menu

- 2.2.1.8 Select a desired channel, and then select the green check mark box to send the settings to the radio.

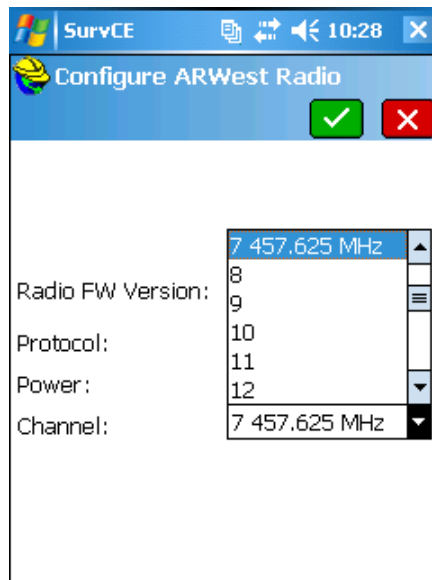


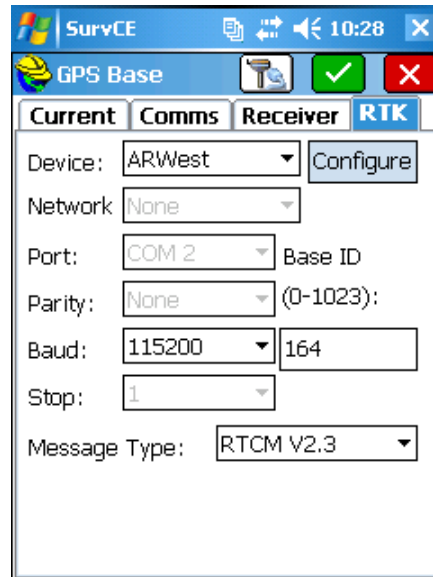
Figure 39: External Radio Channel Selection

- 2.2.1.9 A Device Configured message confirms configuration was sent to the radio.



Figure 40: Device Configured

2.2.1.10 Continue Base setup by selecting the green check mark box. Then, SurvCE will prompt for base position input. Follow the procedures found in the APS-3 User manual to setup the GPS Base Position.



The image shows a screenshot of the 'SurvCE' software window, specifically the 'GPS Base' configuration dialog. The window has a title bar with the 'SurvCE' logo and standard Windows window controls. Below the title bar, there is a toolbar with a green checkmark button and a red X button. The main area of the dialog is divided into four tabs: 'Current', 'Comms', 'Receiver', and 'RTK'. The 'Current' tab is selected. It contains several configuration fields: 'Device' is set to 'ARWest' with a 'Configure' button next to it; 'Network' is set to 'None'; 'Port' is set to 'COM 2'; 'Parity' is set to 'None'; 'Baud' is set to '115200'; 'Stop' is set to '1'; and 'Message Type' is set to 'RTCM V2.3'. There is also a 'Base ID' field with a range of '(0-1023):' and a value of '164'.

Figure 41: GPS Base Settings

2.2.2 Configuration to Receive

2.2.2.1 Start SurvCE → Select Equip tab → Select GPS Rover → Select RTK tab

2.2.2.2 In the RTK tab, select ArWest from the Device menu.

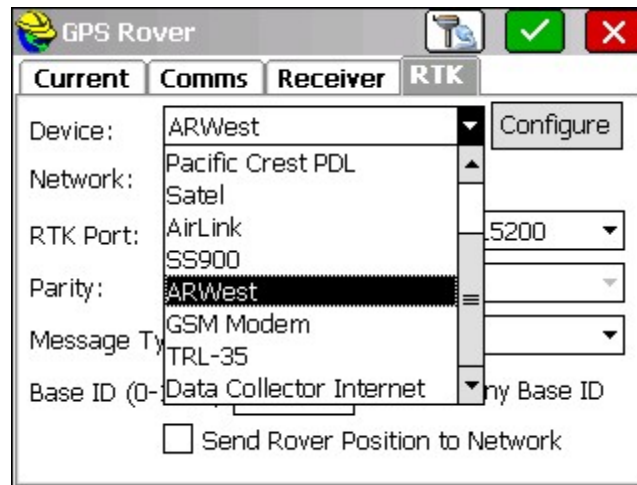


Figure 42: Device Selection

2.2.2.3 In the Baud menu select 115200.

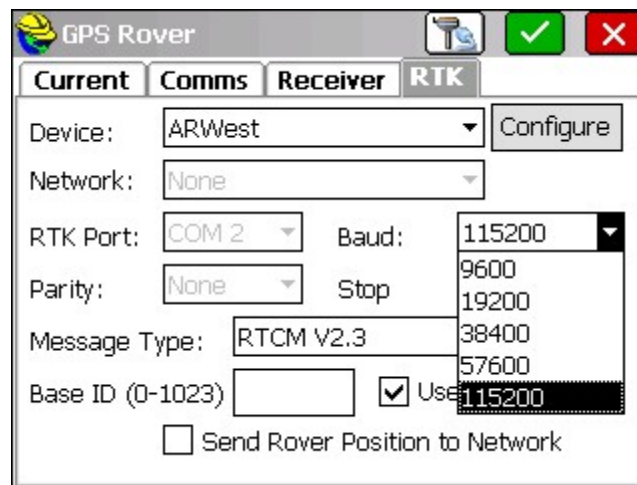


Figure 43: Baud Rate Selection

2.2.2.4 Select the message type of the corrections desired.

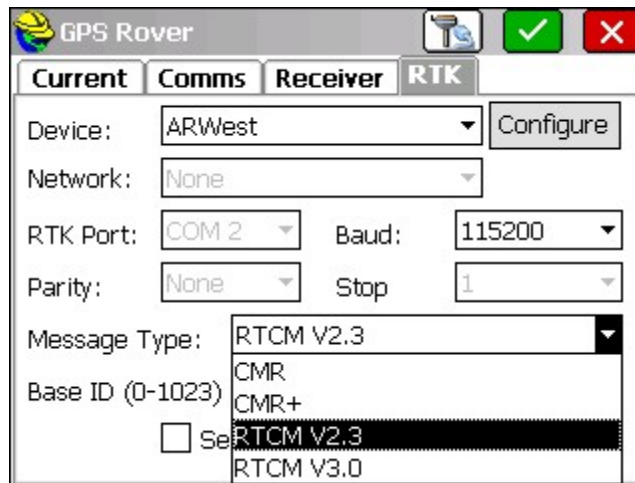


Figure 44: Message Type Menu

2.2.2.5 Select the Configure button to continue configuration.

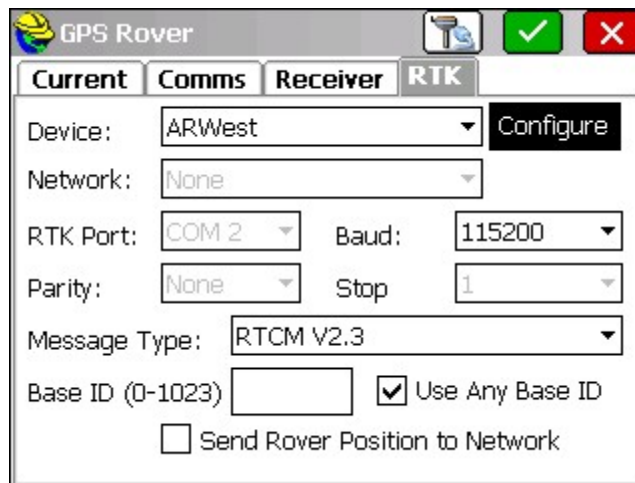
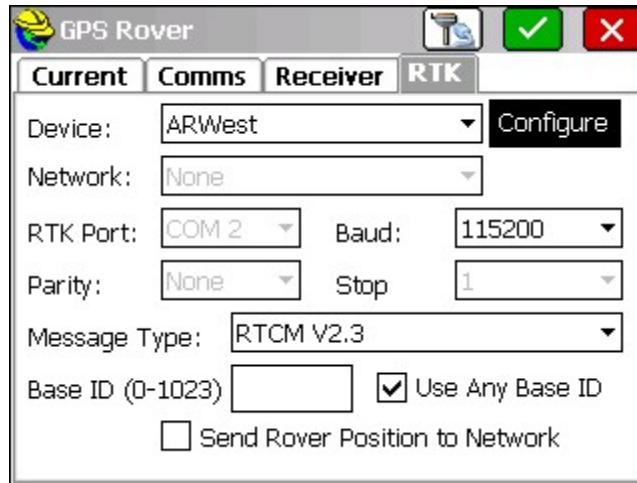


Figure 45: Configure External Base

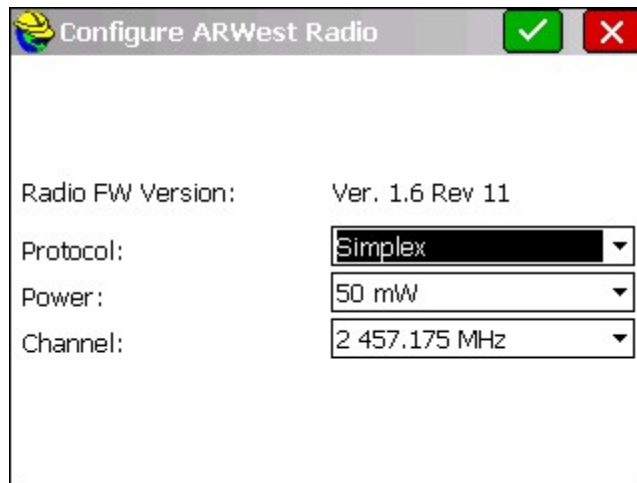
2.2.2.6 Select Protocol/Simplex.



The screenshot shows the 'GPS Rover' application window with the 'RTK' tab selected. The 'Device' dropdown is set to 'ARWest', and a 'Configure' button is to its right. The 'Network' dropdown is set to 'None'. The 'RTK Port' dropdown is set to 'COM 2' and the 'Baud' dropdown is set to '115200'. The 'Parity' dropdown is set to 'None' and the 'Stop' dropdown is set to '1'. The 'Message Type' dropdown is set to 'RTCM V2.3'. There is a text input field for 'Base ID (0-1023)' which is empty, followed by a checked checkbox labeled 'Use Any Base ID'. Below this is an unchecked checkbox labeled 'Send Rover Position to Network'. The window has a standard title bar with a yellow icon, a green checkmark button, and a red close button.

Figure 46: External Radio Protocol Menu

2.2.2.7 The previously selected radio Power and Channel number with frequency is displayed. Select desired Power (Power has no effect on rover), and Channel number, then select the green check mark box to send the settings to the radio.

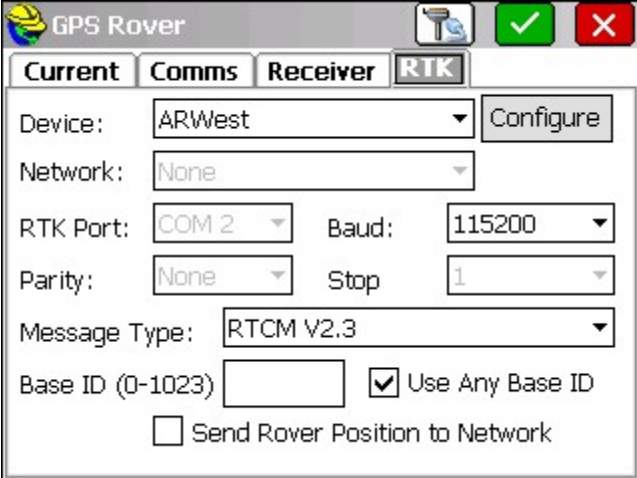


The screenshot shows the 'Configure ARWest Radio' window. It displays the 'Radio FW Version' as 'Ver. 1.6 Rev 11'. The 'Protocol' dropdown is set to 'Simplex'. The 'Power' dropdown is set to '50 mW'. The 'Channel' dropdown is set to '2 457.175 MHz'. The window has a standard title bar with a yellow icon, a green checkmark button, and a red close button.

Figure 47: External Radio Power Menu

2.2.2.8 A Device Configured message confirms configuration was sent to the radio.

2.2.2.9 Continue setup by selecting the green check mark box.



The image shows a software window titled "GPS Rover" with a standard Windows-style title bar. Inside the window, there are four tabs: "Current", "Comms", "Receiver", and "RTK". The "RTK" tab is currently selected and highlighted. Below the tabs, the settings are organized as follows:

- Device:** A dropdown menu showing "ARWest" and a "Configure" button to its right.
- Network:** A dropdown menu showing "None".
- RTK Port:** A dropdown menu showing "COM 2".
- Baud:** A dropdown menu showing "115200".
- Parity:** A dropdown menu showing "None".
- Stop:** A dropdown menu showing "1".
- Message Type:** A dropdown menu showing "RTCM V2.3".
- Base ID (0-1023):** An empty text input box.
- Use Any Base ID:** A checked checkbox.
- Send Rover Position to Network:** An unchecked checkbox.

In the top right corner of the window, there are three buttons: a small icon of a hand holding a tool, a green button with a white checkmark, and a red button with a white 'X'.

Figure 48: GPS Rover Settings

2.3 APS-3 SurvCE Configuration For AW435

2.3.1 Configuration to Receive

2.3.1.1 Start SurvCE → Select Equip tab → Select GPS Rover → Select RTK tab

2.3.1.2 In the RTK tab select Internal Radio from the Device drop down menu.

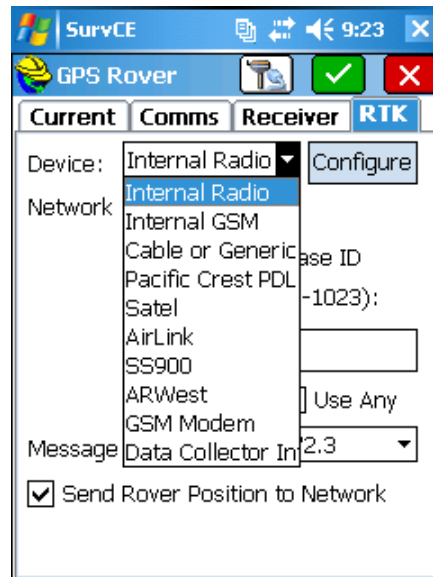


Figure 49: Internal Radio Selection

2.3.1.3 Select Message Type from the drop down menu - CMR / RTCM V2.3 / RTCM V3.0.

2.3.1.4 Then click the Configure button.

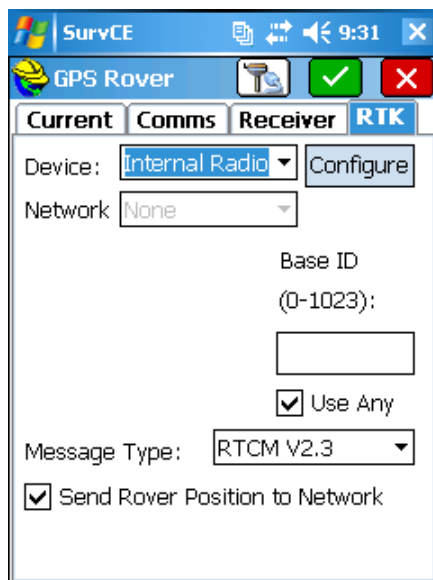


Figure 50: Configure Internal Radio

2.3.1.5 The previously selected radio Power and Channel number with frequency is displayed. Select desired Power (Power has no effect on rover), and Channel number, then select the green check mark box to send the settings to the radio.

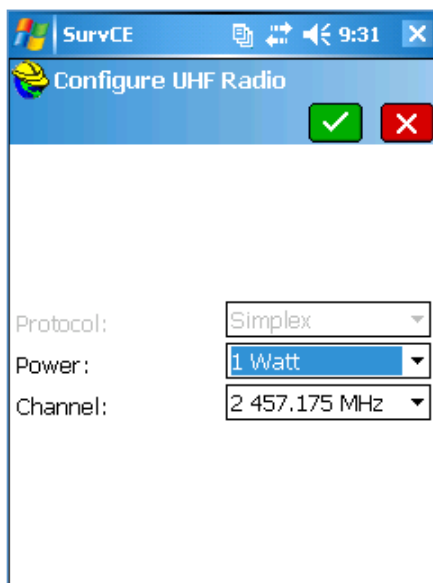


Figure 51: Current Channel Setting

2.3.1.6 Click the *green check mark* to finalize the Rover settings to the receiver. The display will show “Device Configured Successfully,” AND the screen will return to the Equip menu as shown below.

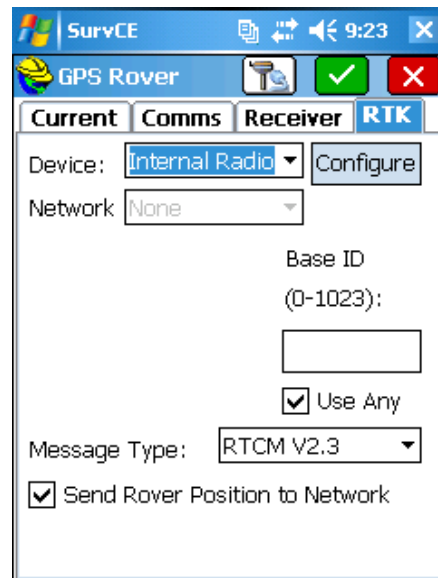


Figure 52: Display after Radio Configuration

2.3.1.7 The Rover configuration is complete.

3 Pacific Crest PDL

3.1 PDLCONF Configuration

3.1.1 Configuration to Transmit/Receive

3.1.1.1 Select the PDL menu button  in the top left corner.

3.1.1.2 Select the Set Capture Method option, and choose Power On Capture or Soft Break.

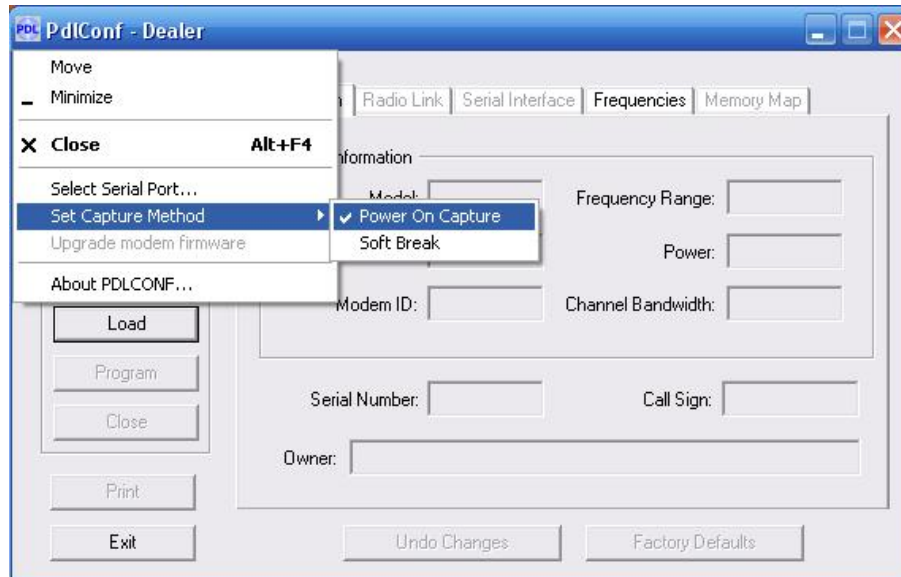


Figure 53: Capture Method Options

3.1.1.3 Click the PDL menu button again, and choose *Select Serial Port...*

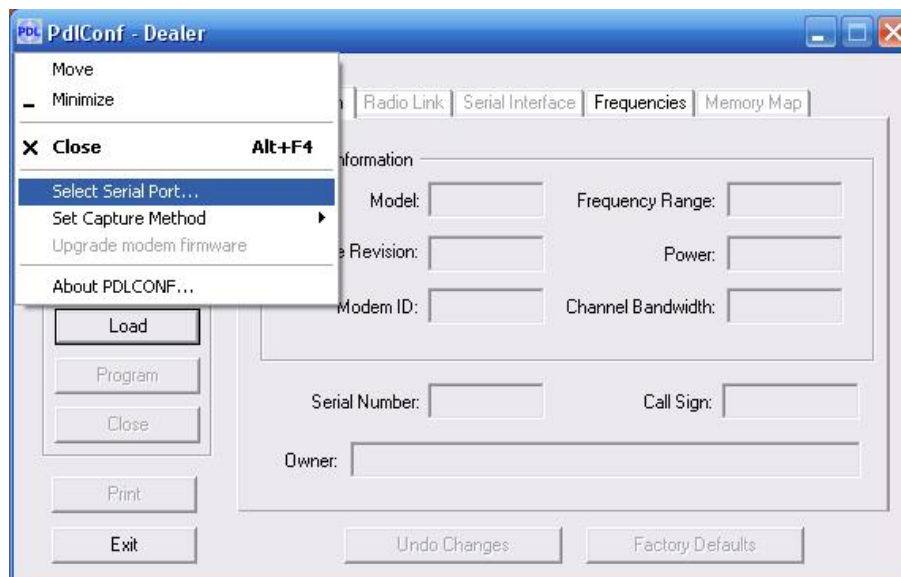


Figure 54: PDLConf Menu Options

- 3.1.1.4 Wait for a moment for the Serial Port menu to display, and then select the computer port where the Pacific Crest PDL radio is connected.

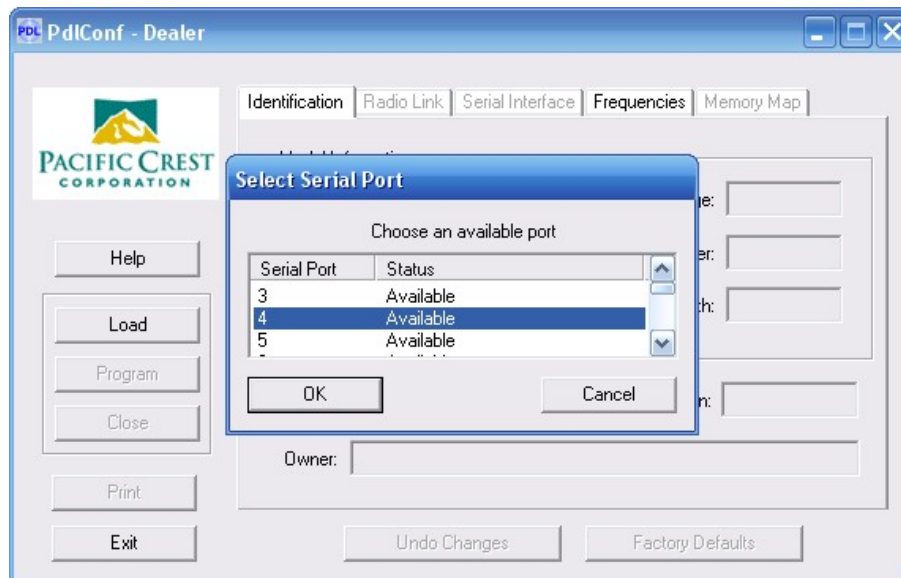


Figure 55: Serial Port Selection

- 3.1.1.5 Select *Load*, and then power on the radio.

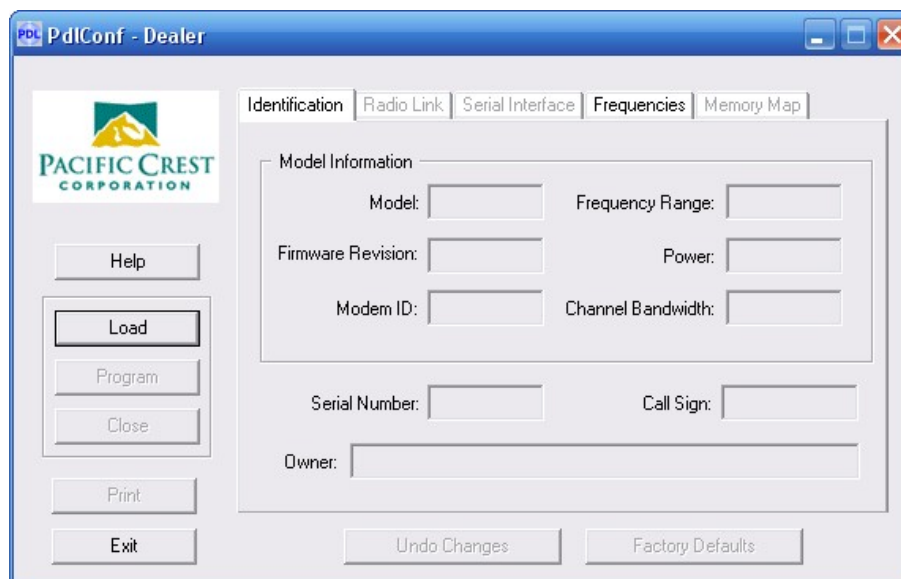


Figure 56: PDLConf Startup Screen

- 3.1.1.6 A progress bar will be displayed when the settings are being read from the modem.

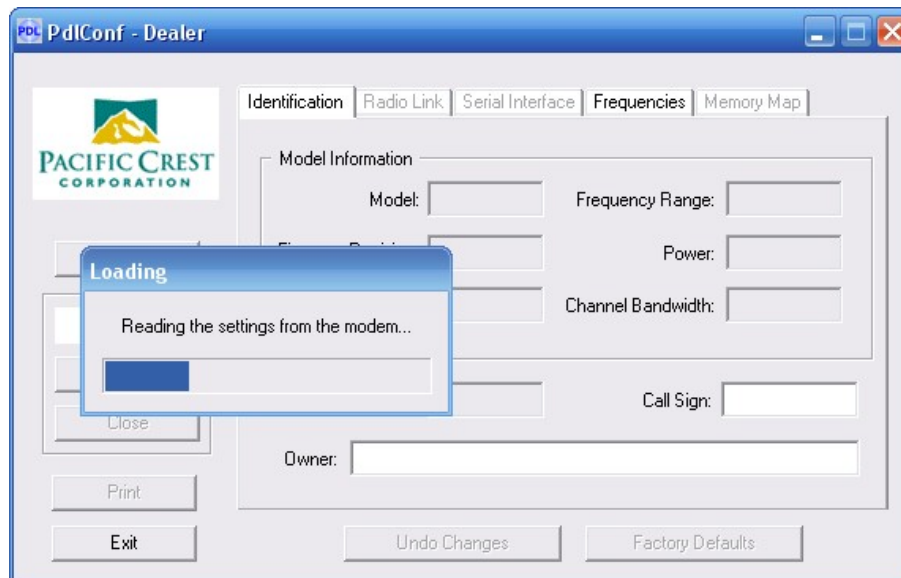


Figure 57: Loading Modem Settings

- 3.1.1.7 Once the settings are obtained from the radio the model information will be displayed.

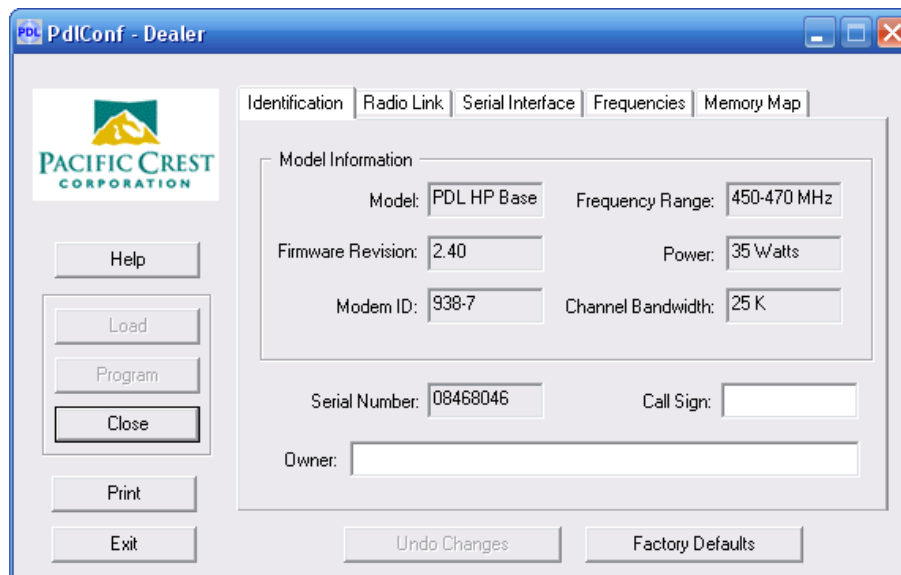


Figure 58: PDL Base Identification

3.1.1.8 Select the *Frequencies* tab, and enter in transmitting and receiving frequencies in MHz.

3.1.1.9 Take note of the channel numbers associated with each frequency, for base/rover radio matching.

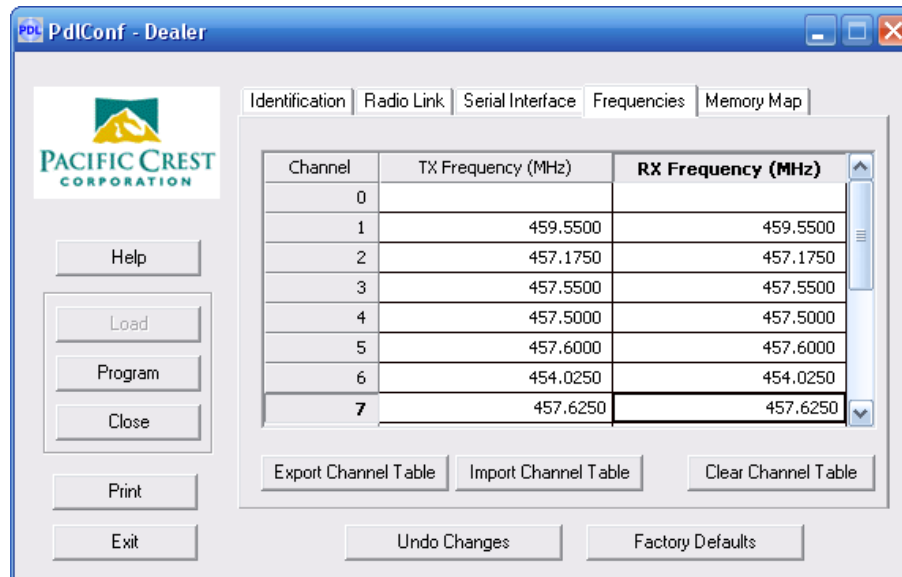


Figure 59: PDL Frequencies



The compatibility of the APS-3 with the PDL is based on the model and firmware at the time of testing. Any change by Pacific Crest may affect operations.

3.1.1.10 Select the *Radio Link* tab.

Channel Select	Manual + Channel
Link Rate	9600
Modulation Type	GMSK
Digisquelch	High
Transmit Retries	3
TX ACK Timeout	0.1
Forward Error Correction	Enabled
Scrambling	Disabled
CSMA Monitor	Enabled
Local Address	0
Remote Address	255

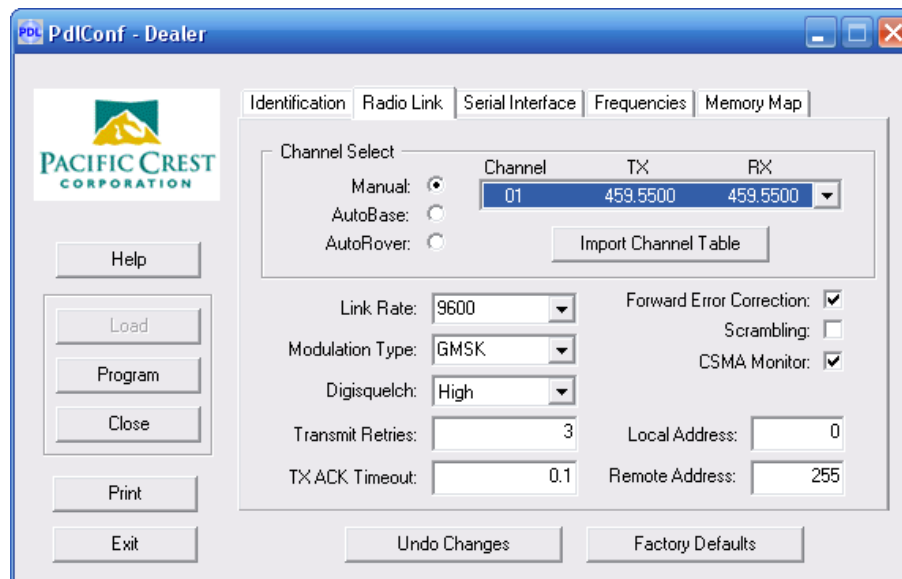


Figure 60: PDL Radio Link

3.1.1.11 Select the *Serial Interface* tab.

3.1.1.12 Port

Baud Rate	38400
Parity	None
Modem Enabled	Enabled
Soft Break Enabled	Enabled
Data Security	00000000

3.1.1.13 Protocol

Mode	Transparent w/EOT Timeout
EOT Count	5
Break to Command	Disabled
Repeater	Disabled
Digipeater Delay	0.00

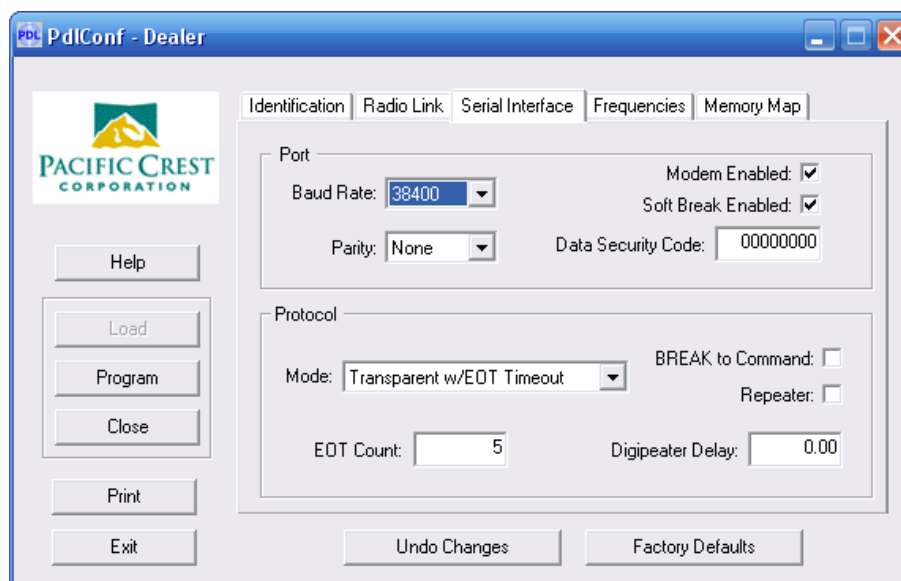


Figure 61: PDL Serial Interface



See the Pacific Crest website for information and tools required to configure the Pac Crest PDL radio modem. When SurvCE is used to configure the Pacific Crest PDL, parameters for Modulation, Link Rate and Serial Interface are automatically set.

3.1.2 PDL Firmware Upgrade

3.1.2.1 Select the PDL menu button  in the top left corner.

3.1.2.2 Then select Upgrade modem firmware.

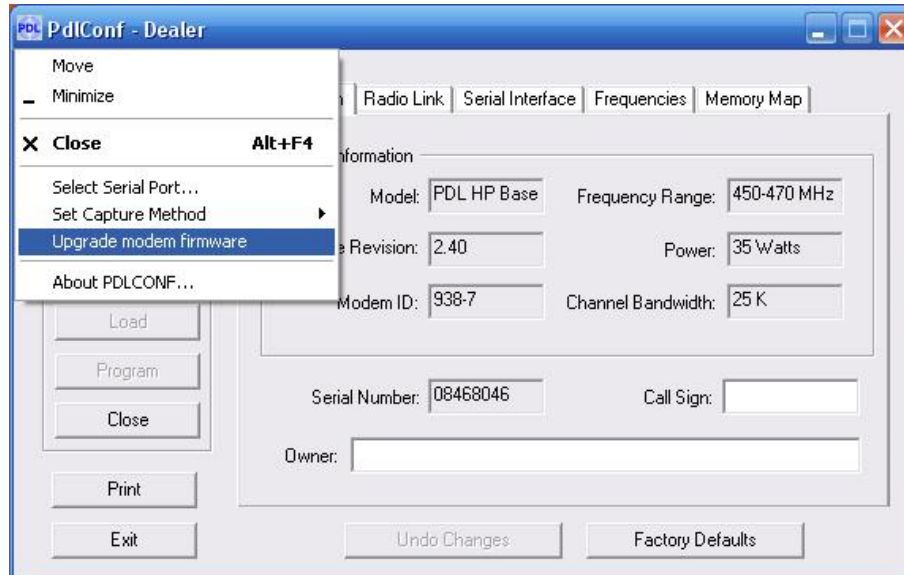


Figure 62: PDLConf Menu selection

3.1.2.3 Path to the saved Pacific Crest firmware files saved on the computer (.fw) and select *Open*.

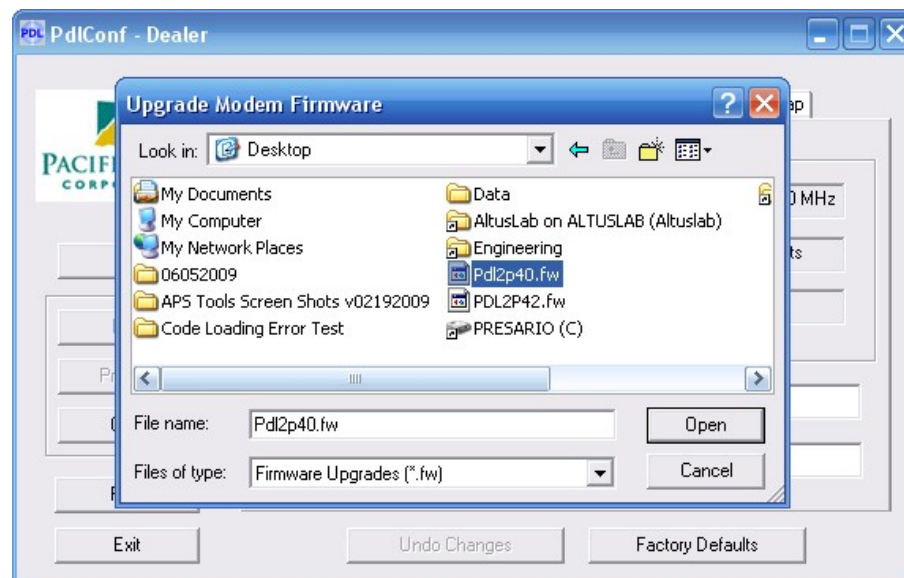


Figure 63: Modem Firmware Selection

3.1.2.4 Select Yes on the confirmation menu.

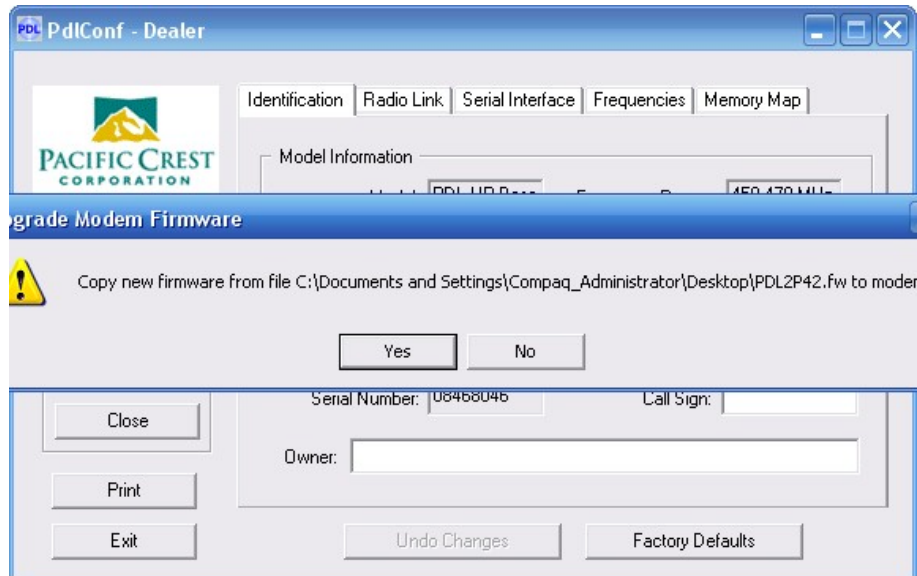


Figure 64: Firmware Location Confirmation

3.1.2.5 A progress bar will display progression of the firmware being downloaded to the modem. Do not disconnect modem at this time.

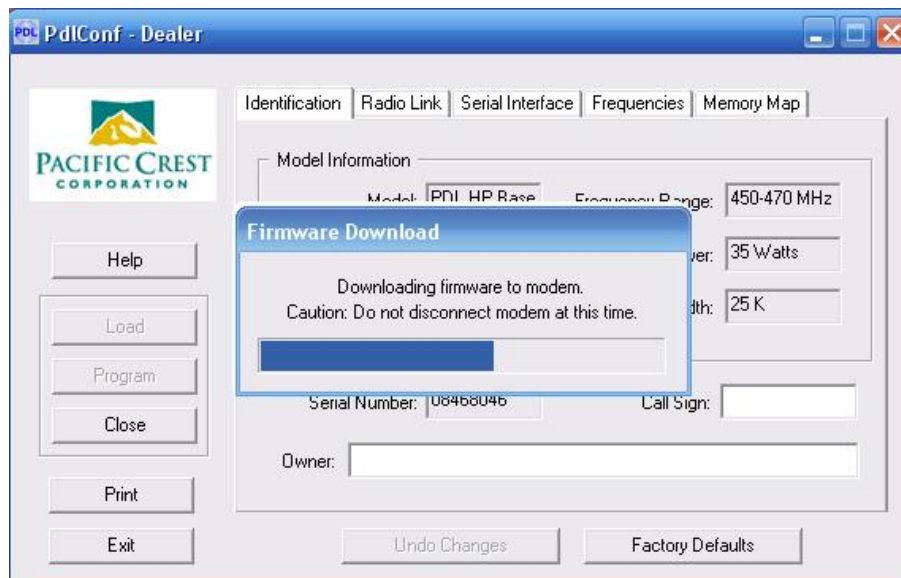


Figure 65: Downloading Firmware to the Modem

3.1.2.6 Once the downloading is complete a confirmation will display the firmware revision that has been written to the modem. Select *Ok*.

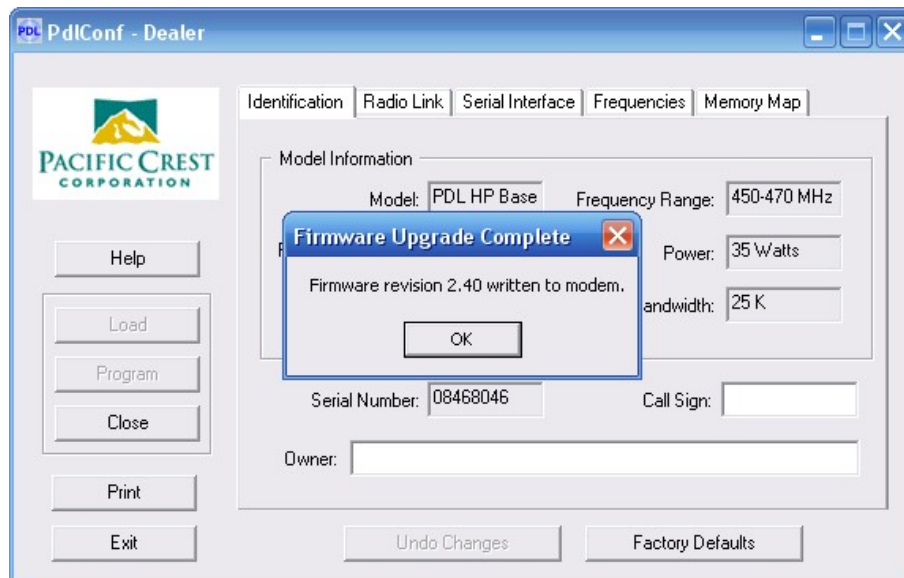


Figure 66: Firmware Upgrade Confirmation

3.1.2.7 Power-cycle the radio *OFF* and *ON*, then reload the radio and verify the firmware upgrade in the model information under the *Identification* tab.

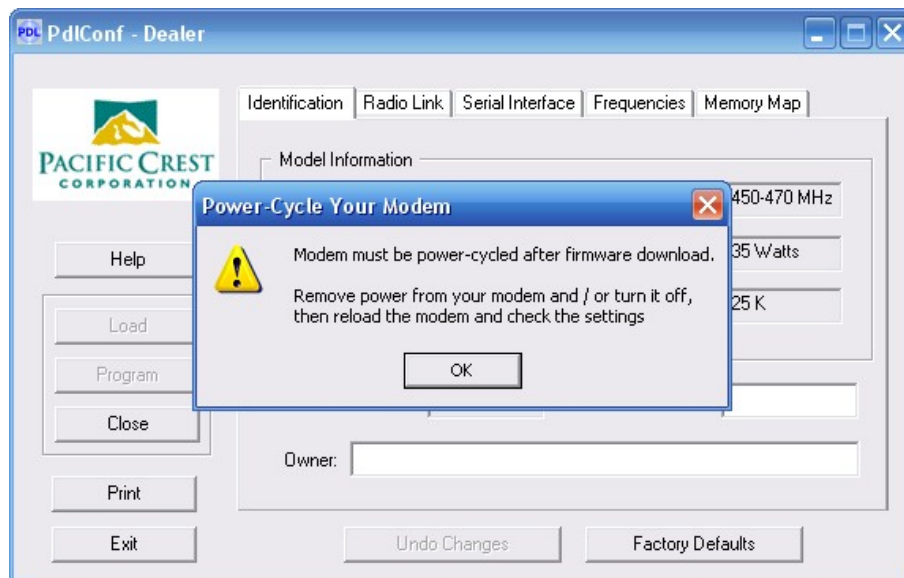


Figure 67: Firmware Upgrade – Cycle Power

3.1.2.8 The radio firmware has successfully been upgraded.

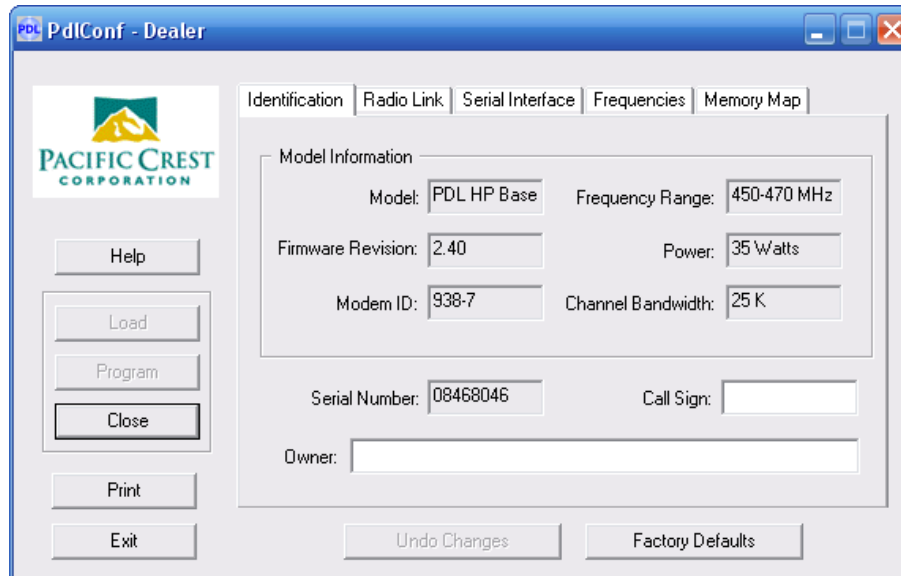


Figure 68: Firmware Upgrade Complete

3.1.3 Pacific Crest PDL Repeater

3.1.3.1 Select the PDL menu button  in the top left corner.

3.1.3.2 Select the Set Capture Method option, and choose Power On Capture or Soft Break.

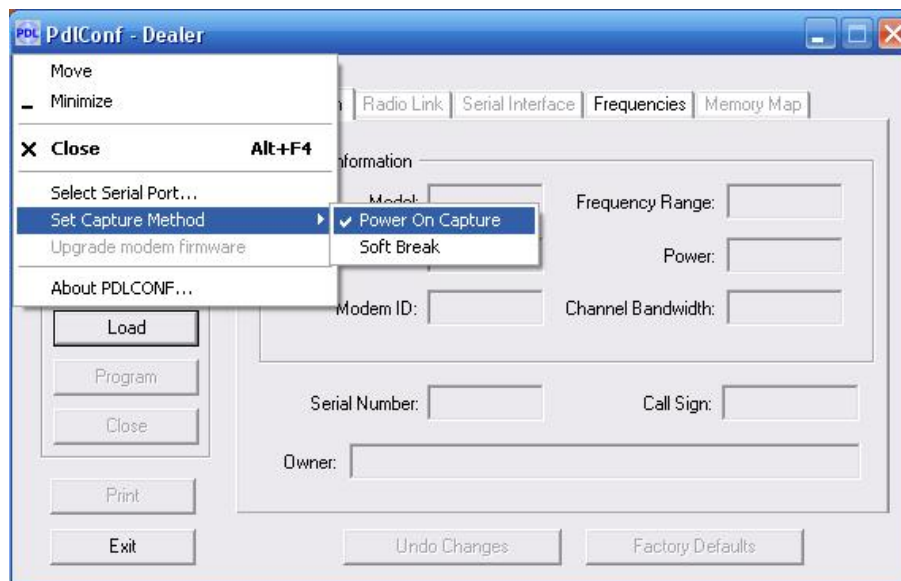


Figure 69: Capture Method Options

3.1.3.3 Click the PDL menu button again, and choose *Select Serial Port...*

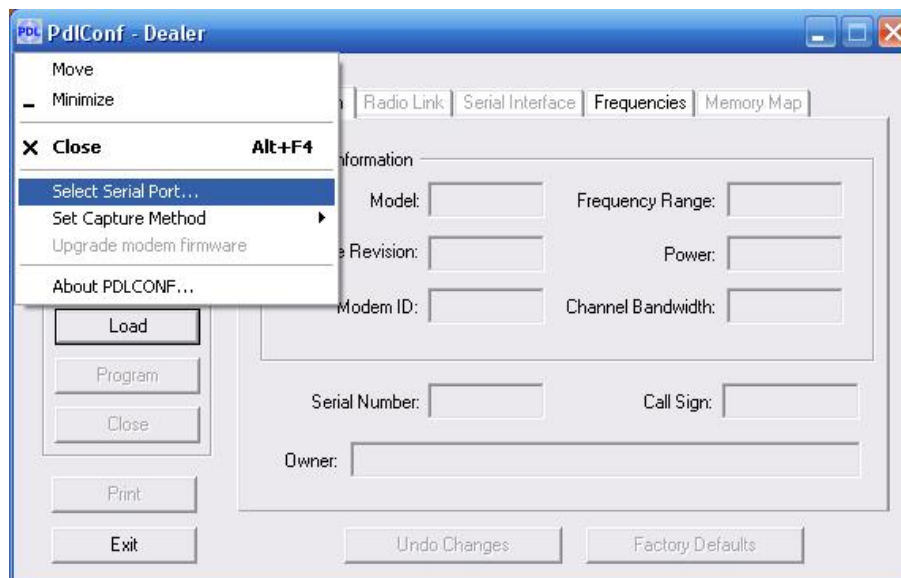


Figure 70: Opening a COM Port

- 3.1.3.4 Wait for a moment for the Serial Port menu to display, and then select the computer port where the Pacific Crest PDL radio is connected.

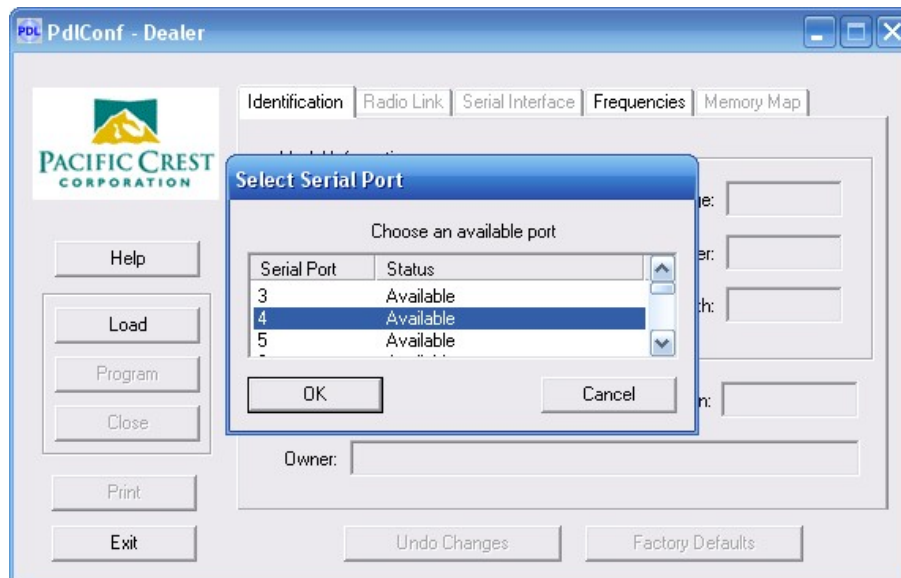


Figure 71: Serial Port Selection

- 3.1.3.5 Select *Load*, and then power on the radio.

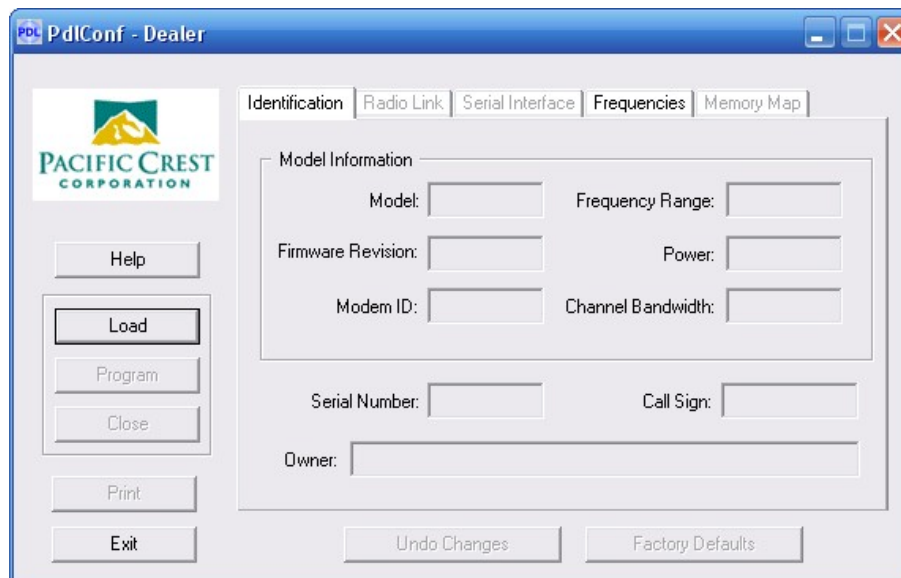


Figure 72: PDLConf Startup Screen

- 3.1.3.6 A progress bar will be displayed when the settings are being read from the modem.

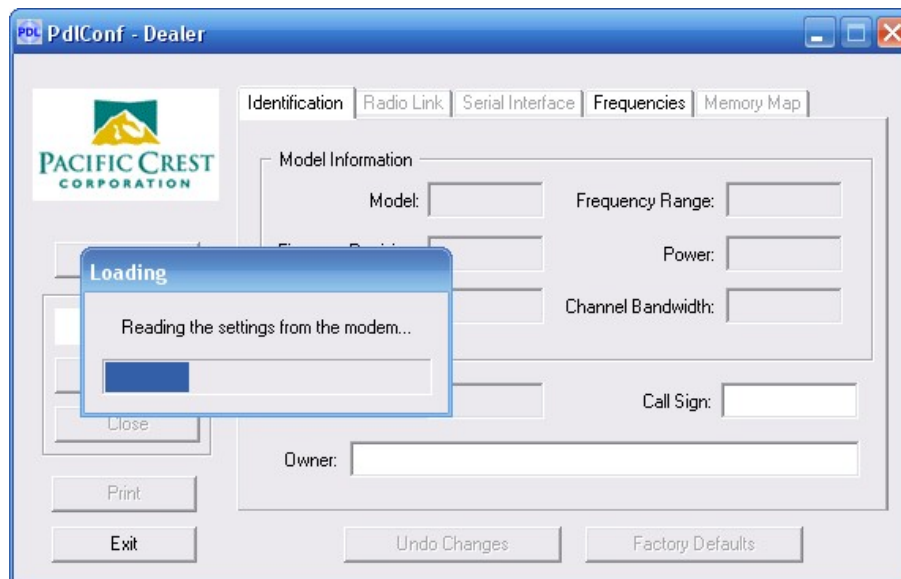


Figure 73: Loading Modem Settings

3.1.3.7 Once the settings are obtained from the radio the model information will be displayed.

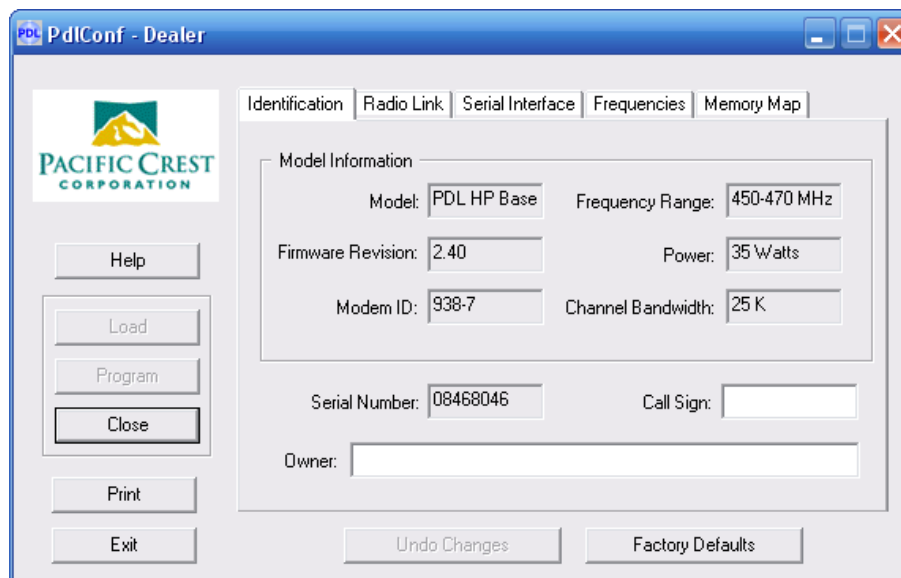


Figure 74: PDL Base Identification

3.1.3.8 Select the *Frequencies* tab, and enter in transmitting and receiving frequencies in MHz.

3.1.3.9 Take note of the channel numbers associated with each frequency, for base/rover radio matching.

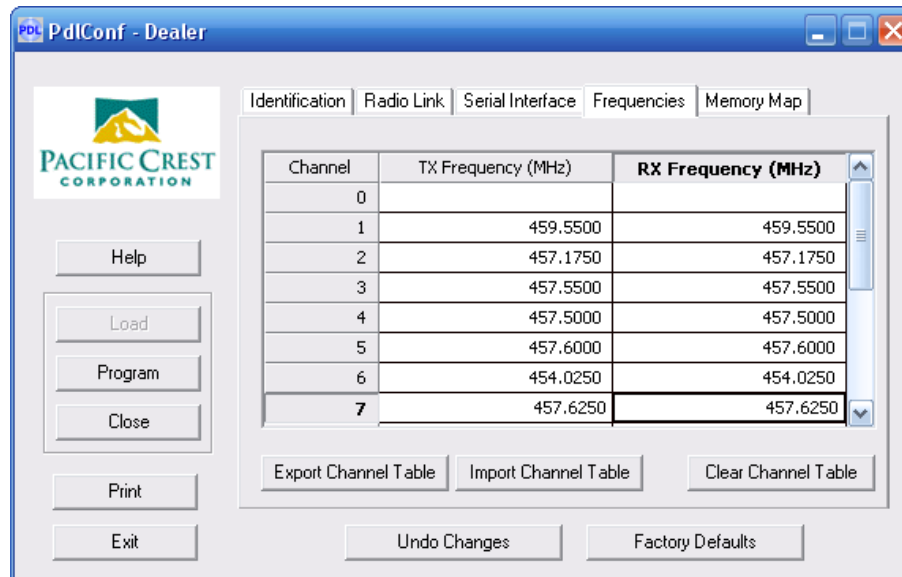


Figure 75: PDL Frequencies



The compatibility of the APS-3 with the PDL is based on the model and firmware at the time of testing. Any change by Pacific Crest may affect operations.

3.1.3.10 Select the *Radio Link* tab.

Channel Select	Manual + Channel
Link Rate	9600
Modulation Type	GMSK
Digisquelch	High
Transmit Retries	3
TX ACK Timeout	0.1
Forward Error Correction	Enabled
Scrambling	Disabled
CSMA Monitor	Enabled
Local Address	0
Remote Address	255

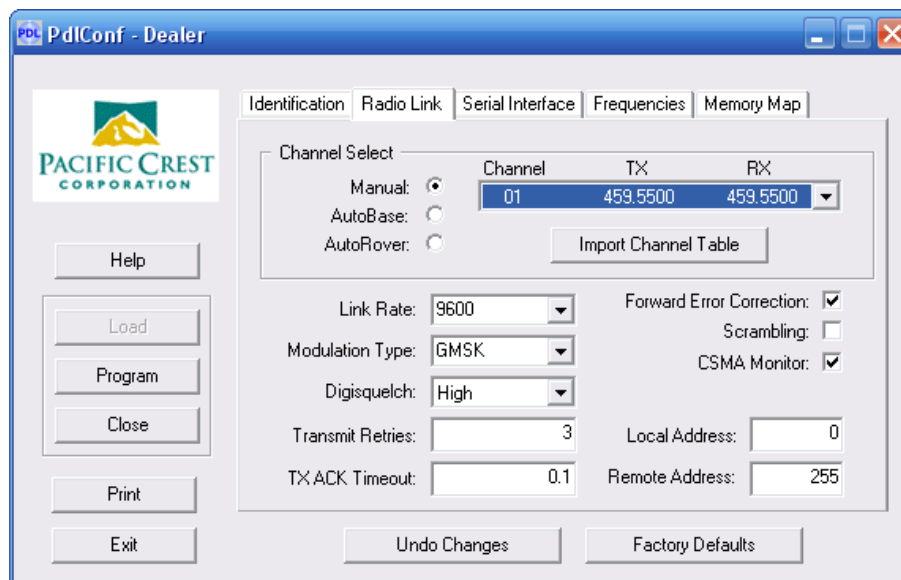


Figure 76: PDL Radio Link

3.1.3.11 Select the *Serial Interface* tab.

3.1.3.12 Port

Baud Rate	38400
Parity	None
Modem Enabled	Enabled
Soft Break Enabled	Enabled
Data Security	00000000

3.1.3.13 Protocol

Mode	Transparent w/EOT Timeout
EOT Count	5
Break to Command	Disabled
Repeater	Enabled
Digipeater Delay	0.00

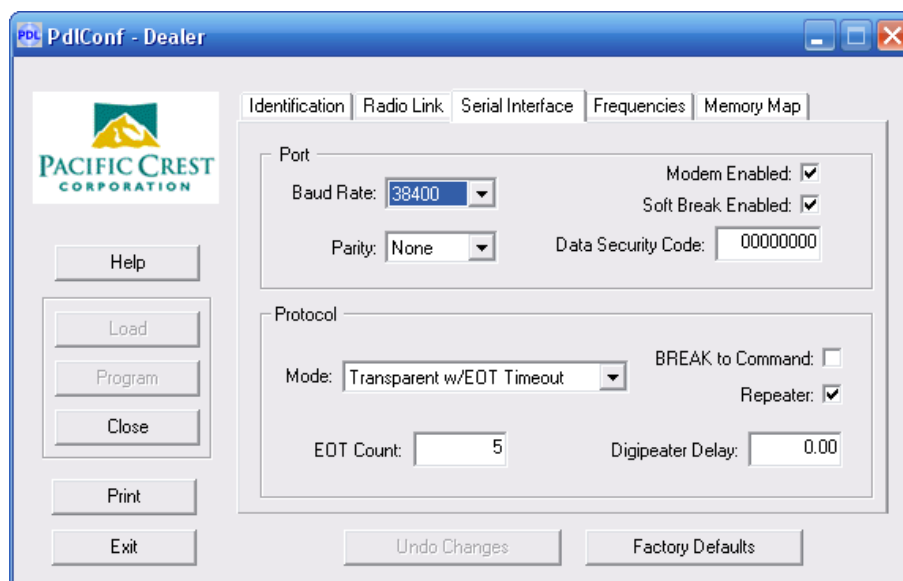


Figure 77: PDL Serial Interface

3.1.3.14 Once all the settings have been set, select the *Program* button. Then select Yes on the confirmation screen.

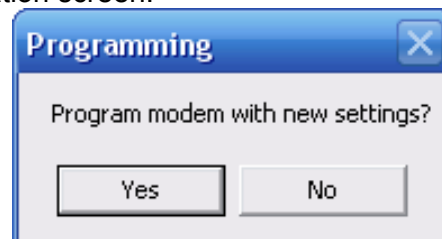


Figure 78: Programming Confirmation

The new settings will be displayed when the programming is complete. Click *Close* when

3.2 PDL SurvCE Configuration

3.2.1 Configuration to Transmit

3.2.1.1 Select SurvCE → Equip tab → GPS Base → RTK tab

3.2.1.2 In the RTK tab, select Device = Pacific Crest PDL.

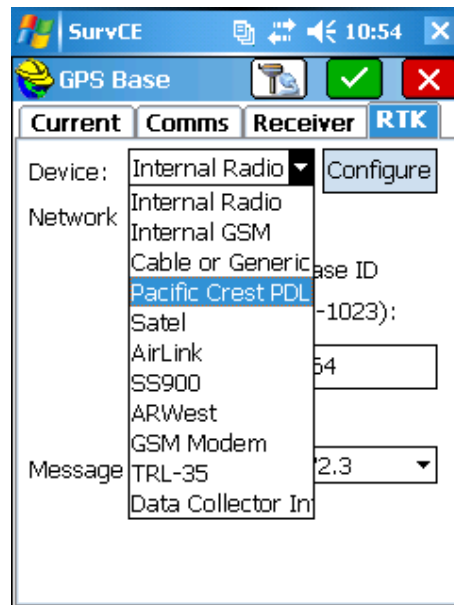


Figure 79: External Radio Device Selection

3.2.1.3 Select the desired Baud Rate for the Pacific Crest PDL. (Note: The highest baud rate for the Pacific Crest PDL is 38400).

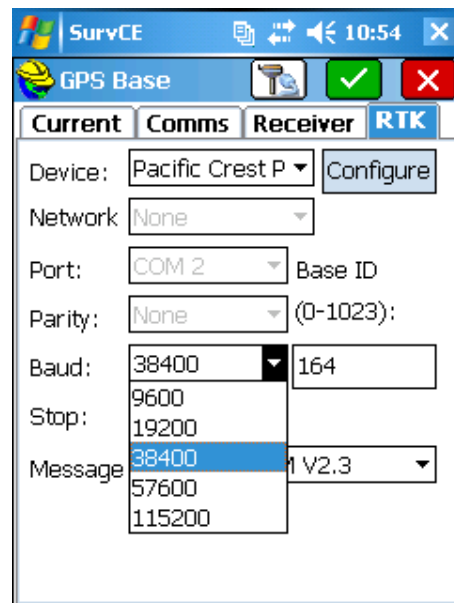


Figure 80: Baud Rate Selection

3.2.1.4 Select the message type of the corrections desired.

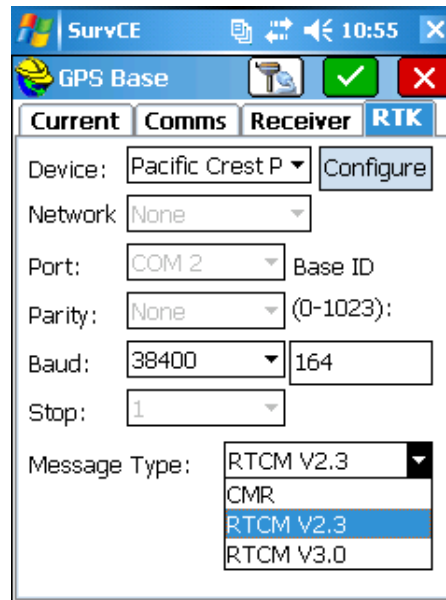


Figure 81: Message Type Selection

3.2.1.5 Select the Configure button to continue configuring the external Pacific Crest PDL radio.



Figure 82: Pac. Crest PDL Configuration

3.2.1.6 The current configuration of the radio is shown. Select a desired channel to transmit on and select Squelch = Low. Then select the green check mark box to continue with the base setup.

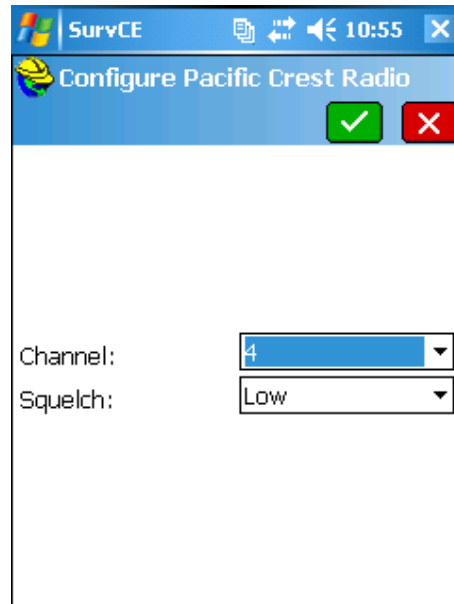


Figure 83: External Pac Crest Radio

3.2.1.7 A Device Configured message confirms configuration was sent to the radio.

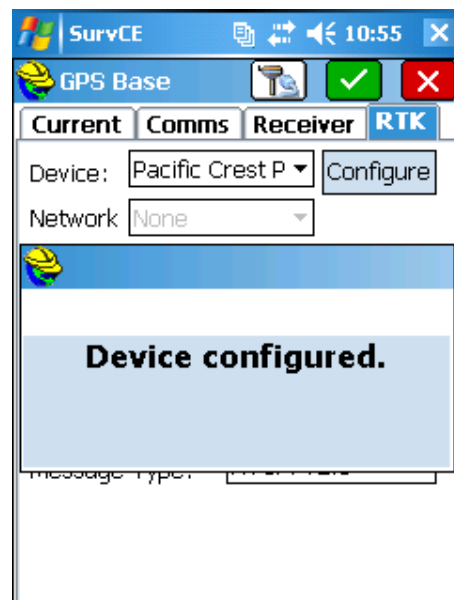
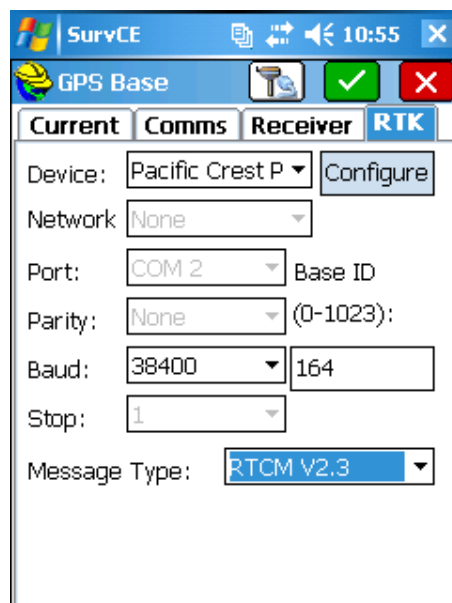


Figure 84: Device Configured

3.2.1.8 Continue Base setup by selecting the green check mark box. Then, SurvCE will prompt for base position input. Follow the procedures found in the APS-3 User Manual to setup the GPS Base Position.



The image shows a screenshot of the 'SurvCE' software window, specifically the 'GPS Base' configuration tab. The window has a standard Windows-style title bar with the text 'SurvCE' and a clock showing '10:55'. Below the title bar is a toolbar with a green checkmark button and a red 'X' button. The main area of the window is divided into four tabs: 'Current', 'Comms', 'Receiver', and 'RTK'. The 'Comms' tab is currently selected. Within the 'Comms' tab, there are several configuration fields: 'Device' is set to 'Pacific Crest P' with a 'Configure' button next to it; 'Network' is set to 'None'; 'Port' is set to 'COM 2'; 'Parity' is set to 'None'; 'Baud' is set to '38400'; 'Stop' is set to '1'; and 'Message Type' is set to 'RTCM V2.3'. There is also a 'Base ID' field with the value '164' and a label '(0-1023):' next to it.

Figure 85: Complete Base setup

3.2.2 Configuration to Receive

3.2.2.1 Start SurvCE → Select Equip tab → Select GPS Rover → Select RTK tab

3.2.2.2 In the RTK tab, select *Pacific Crest PDL* from the Device menu.

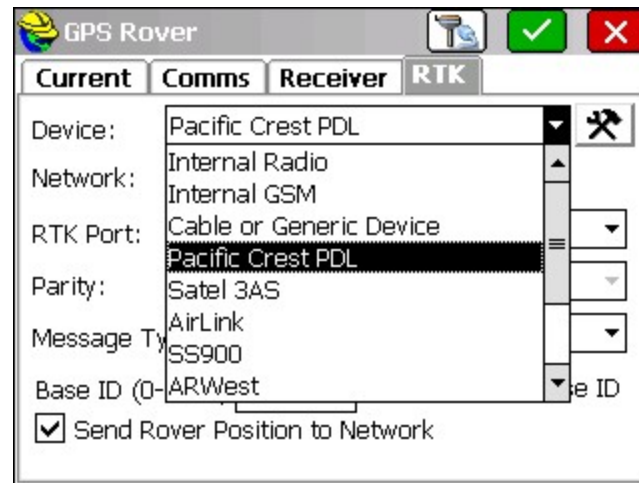


Figure 86: RTK Device Selection

3.2.2.3 In the Baud menu select 38400.

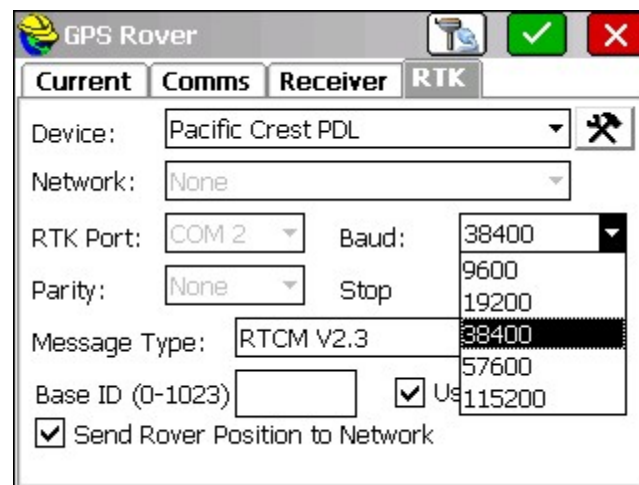


Figure 87: Baud Rate Selection

3.2.2.4 Select the message type of the corrections desired.

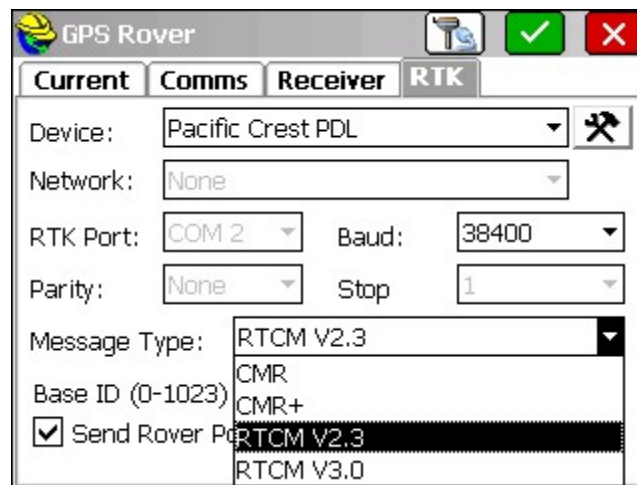


Figure 88: Message Type Selection

3.2.2.5 Select the Configure button  to continue configuration.

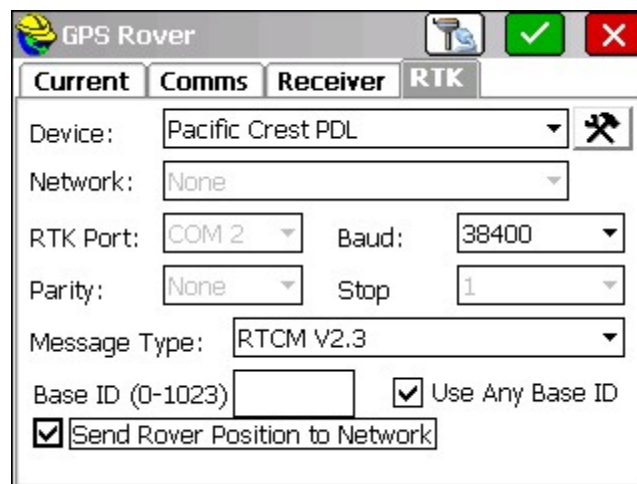


Figure 89: Pacific Crest PDL Setup

3.2.2.6 The previously configured radio Channel and Squelch level will be displayed. Select a desired channel number and squelch level, and then select the green check mark box to send the settings to the radio.

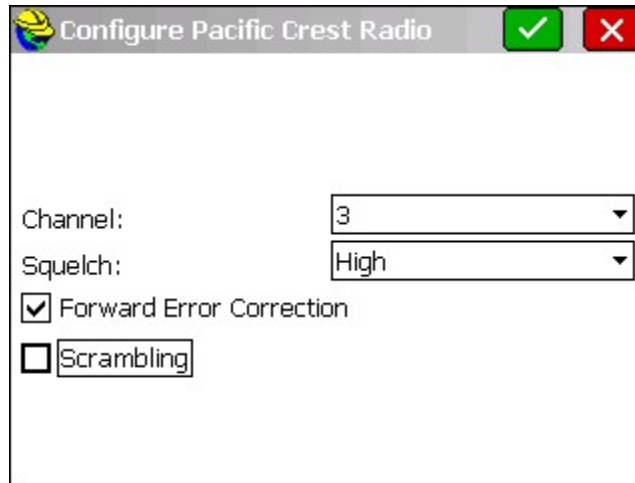


Figure 90: Pacific Crest Radio Settings

3.2.2.7 A Device Configured message confirms configuration was sent to the radio.

3.2.2.8 Continue setup by selecting the green check mark box.

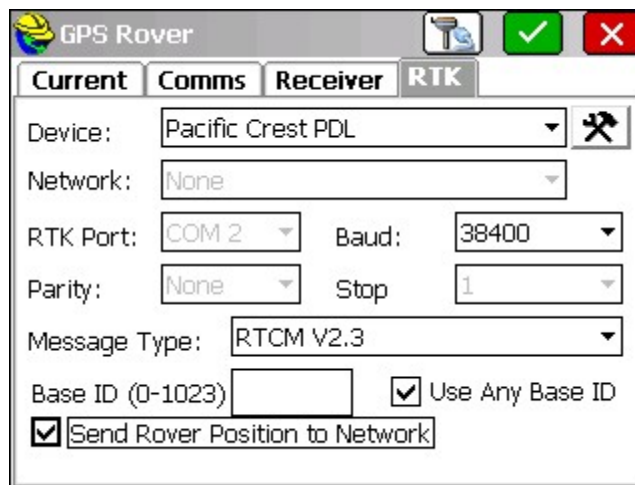


Figure 91: Pacific Crest PDL Setup Complete

3.3 APS-3 SurvCE Configuration For PDL

3.3.1 Configuration to Transmit

3.3.1.1 Select SurvCE → Equip tab → GPS Base → RTK tab

3.3.1.2 In the RTK tab, select Device = Internal Radio.

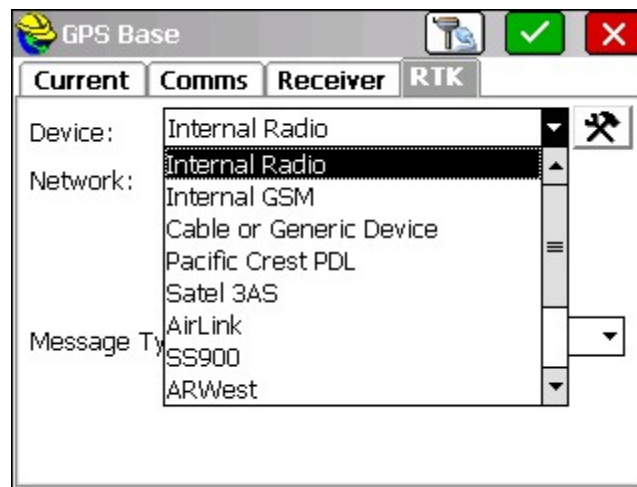


Figure 92: RTK Device Selection

3.3.1.3 Select the message type of the corrections desired.

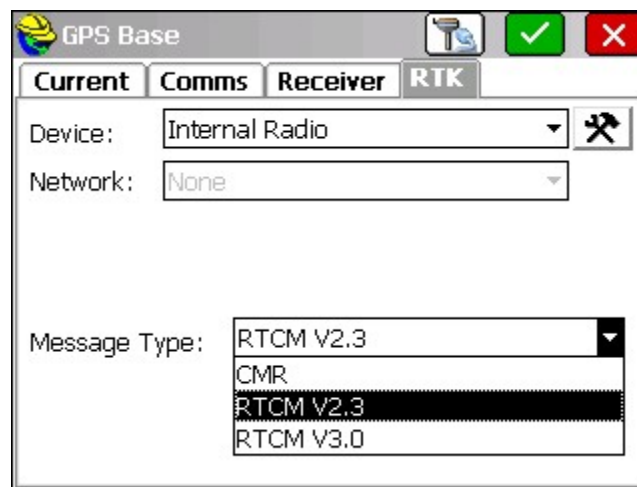


Figure 93: Message Type Selection

3.3.1.4 Select the Configure button. The current configuration of the radio is shown. Select a *Protocol/PDL w/EOT*, *Power/User Specified*, *Channel/User*. Then select the green check mark box to continue with the base setup.

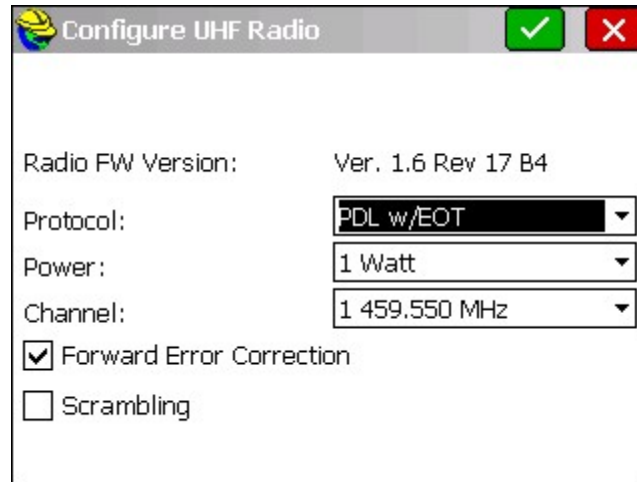


Figure 94: Radio Settings

3.3.1.5 A Device Configured message confirms configuration was sent to the radio.

3.3.1.6 Continue Base setup by selecting the green check mark box. Then, SurvCE will prompt for base position input. Follow the procedures found in the APS-3 User manual to setup the GPS Base Position.

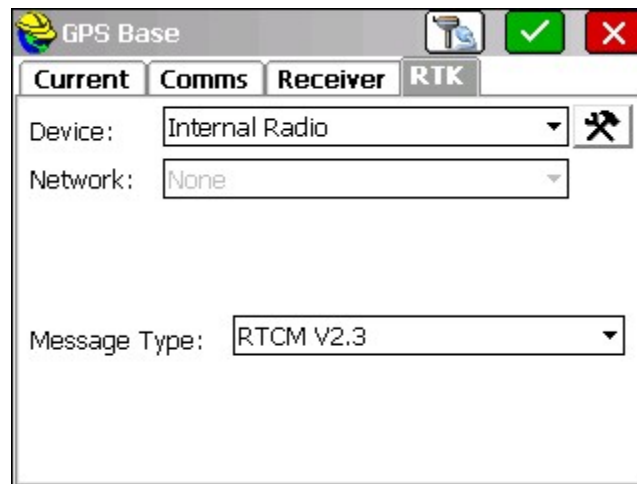


Figure 95: Radio Configured

3.3.2 Configuration to Receive

3.3.2.1 Start SurvCE → Select Equip tab → Select GPS Rover → Select RTK tab

3.3.2.2 In the RTK tab, select Device = Internal Radio.

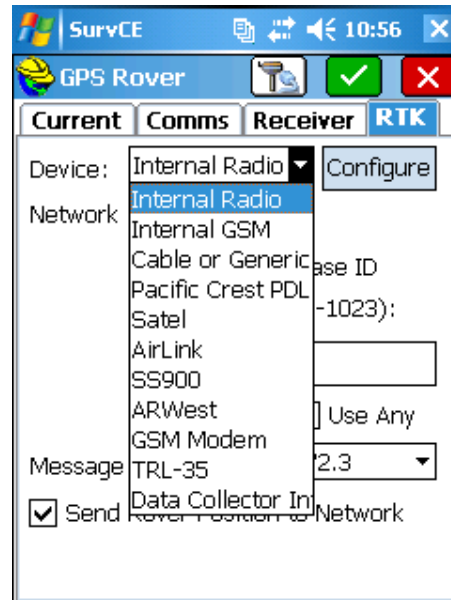


Figure 96: Internal Radio w/ Base Ext. Radio

3.3.2.3 In the RTK tab, select Message Type to match base message type. Then select Configure.

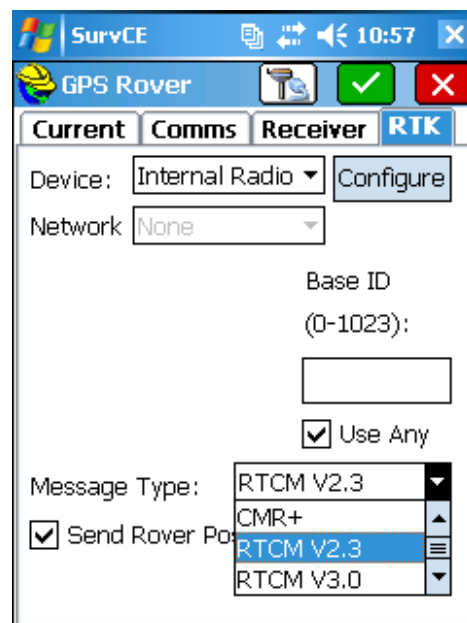


Figure 97: Message Type Menu

3.3.2.4 The previously setup configuration will be recalled.

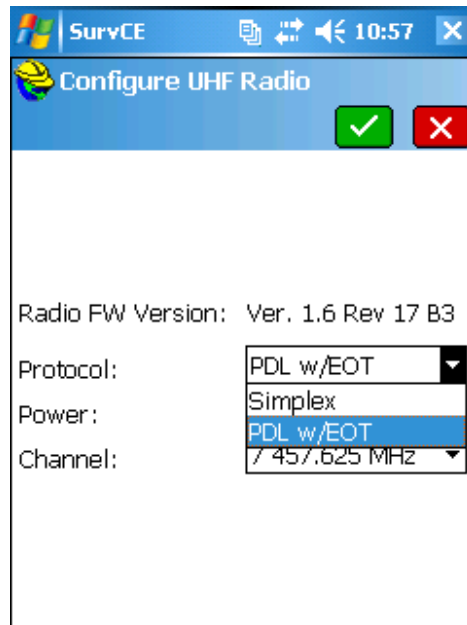


Figure 98: Configuration Settings

3.3.2.5 In the Configuration Menu, select Protocol = PDL w/EOT, Power = 1 Watt, Channel = match frequency to base frequency. An example configuration for a rover receiving from an external Pacific Crest Radio is below.

3.3.2.6 Select the green check mark box to send the configuration to the radio.

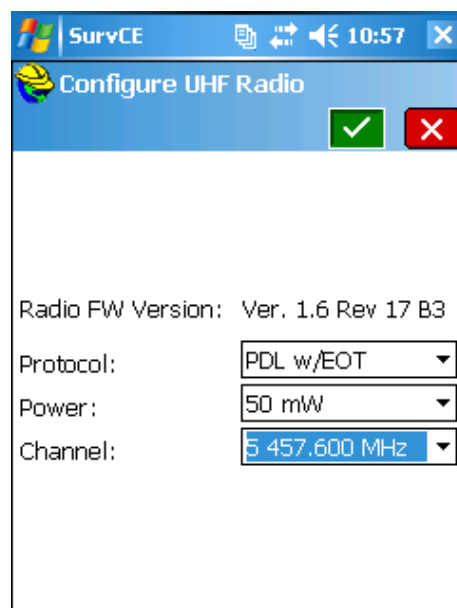


Figure 99: Internal Radio w/ PDL Settings

3.3.2.7 After the Device Configured message, select the green check mark box to finalize the GPS Rover (receiving from a Pacific Crest PDL) configuration. The screen will return to the main Equip menu.

The screenshot shows the 'GPS Rover' configuration window within the 'SurvCE' application. The window has a title bar with the application name and a clock showing 10:58. Below the title bar is a toolbar with a green checkmark icon and a red 'X' icon. The main area contains several tabs: 'Current', 'Comms', 'Receiver', and 'RTK'. The 'Receiver' tab is currently selected. Under this tab, there are two dropdown menus: 'Device' set to 'Internal Radio' and 'Network' set to 'None'. To the right of the 'Device' dropdown is a 'Configure' button. Below these dropdowns is a 'Base ID' field with the label '(0-1023):' and an empty text box. Below the text box is a checked checkbox labeled 'Use Any'. Further down is a 'Message Type' dropdown menu set to 'RTCM V2.3'. At the bottom is another checked checkbox labeled 'Send Rover Position to Network'.

Figure 100: GPS Rover Configuration

4 Satel Radio

This configuration is under development

4.1 Sateline SaTerm Configuration

4.1.1 Configuration to Transmit/Receive

4.1.1.1 Start up SATELLINE SaTerm 4.0.4

4.1.1.2 Select the **New Terminal** button  below the mode menu.

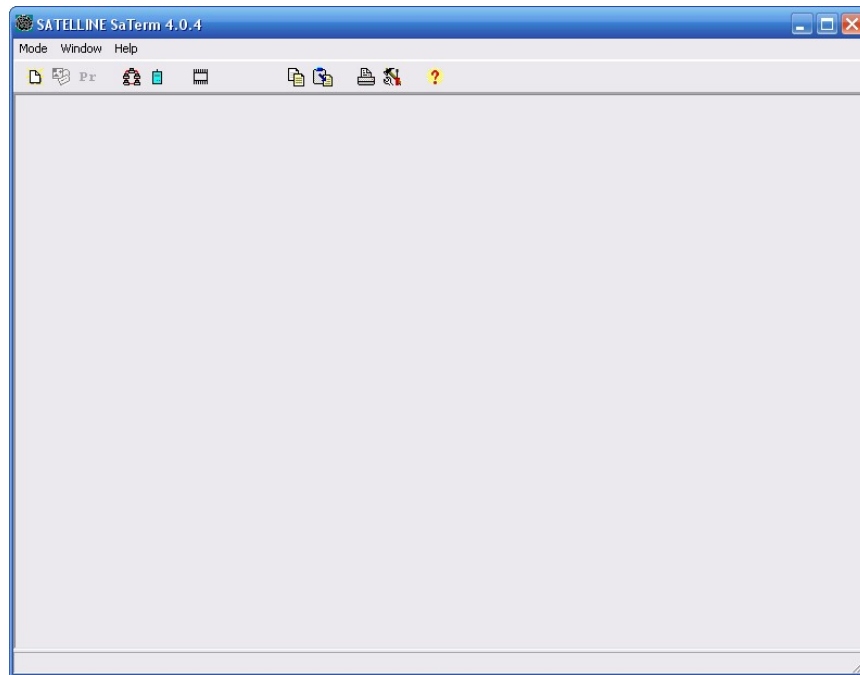
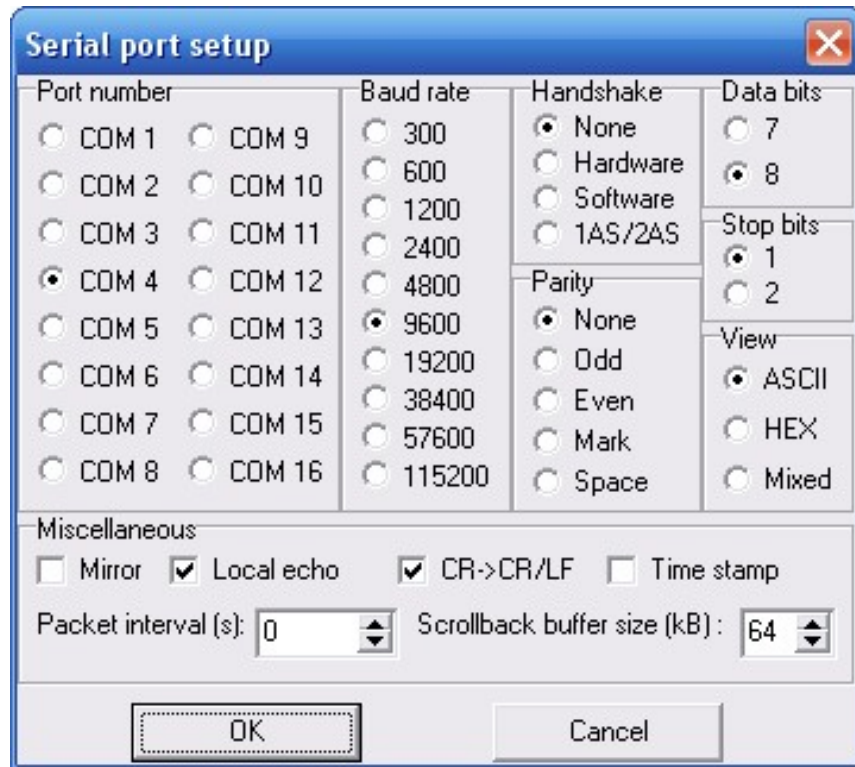


Figure 101: Sateline SaTerm Startup Page

4.1.1.3 Select the **Port number** where the radio is connected.

4.1.1.4 Select **9600** for the Baud rate, and leave other fields unchanged except for user specific requirements. Then select **OK**.



The image shows a 'Serial port setup' dialog box with a blue title bar and a close button (X) in the top right corner. The dialog is divided into several sections. The 'Port number' section on the left contains two columns of radio buttons for COM 1 through COM 16, with COM 4 selected. The 'Baud rate' section in the middle contains a list of radio buttons from 300 to 115200, with 9600 selected. The 'Handshake' section contains radio buttons for None, Hardware, Software, and 1AS/2AS, with None selected. The 'Parity' section contains radio buttons for None, Odd, Even, Mark, and Space, with None selected. The 'Data bits' section contains radio buttons for 7 and 8, with 8 selected. The 'Stop bits' section contains radio buttons for 1 and 2, with 1 selected. The 'View' section contains radio buttons for ASCII, HEX, and Mixed, with ASCII selected. The 'Miscellaneous' section at the bottom contains checkboxes for Mirror, Local echo (checked), CR->CR/LF (checked), and Time stamp. Below these are two spin boxes: 'Packet interval (s):' set to 0 and 'Scrollback buffer size (kB):' set to 64. At the bottom are 'OK' and 'Cancel' buttons.

Port number		Baud rate	Handshake	Data bits
☐ COM 1	☐ COM 9	☐ 300	☒ None	☐ 7
☐ COM 2	☐ COM 10	☐ 600	☐ Hardware	☒ 8
☐ COM 3	☐ COM 11	☐ 1200	☐ Software	Stop bits
☐ COM 4	☐ COM 12	☐ 2400	☐ 1AS/2AS	☒ 1
☐ COM 5	☐ COM 13	☐ 4800	Parity	☐ 2
☐ COM 6	☐ COM 14	☒ 9600	☒ None	View
☐ COM 7	☐ COM 15	☐ 19200	☐ Odd	☒ ASCII
☐ COM 8	☐ COM 16	☐ 38400	☐ Even	☐ HEX
		☐ 57600	☐ Mark	☐ Mixed
		☐ 115200	☐ Space	

Miscellaneous

☐ Mirror ☒ Local echo ☒ CR->CR/LF ☐ Time stamp

Packet interval (s): 0 Scrollback buffer size (kB): 64

OK Cancel

Figure 102: Serial Port Setup

- 4.1.1.5 Put the radio into programming mode by flipping the **Programming Mode Switch**.
- 4.1.1.6 The Current Settings will be displayed in the main menu of programming mode.
- 4.1.1.7 Enter in selection 1 to adjust the Radio Frequency.

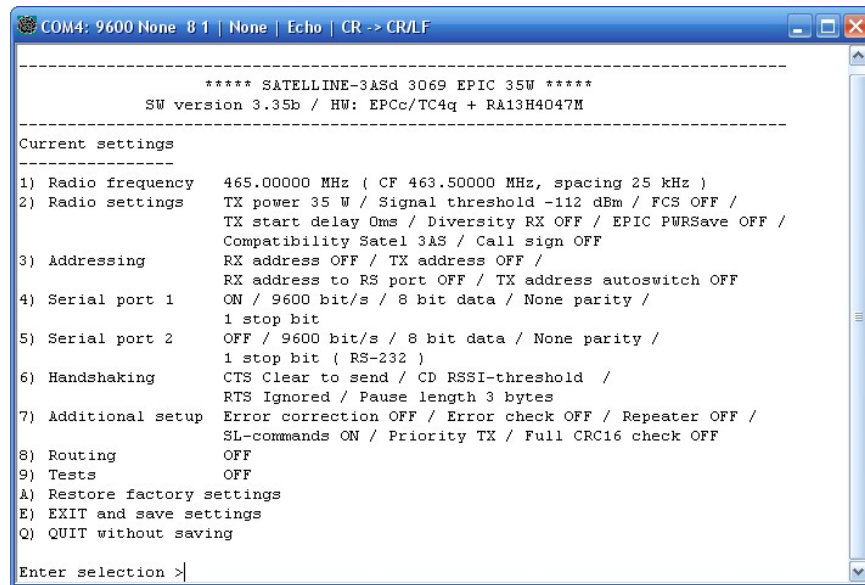


Figure 103: Current Setting/ Main Menu

- 4.1.1.8 In the Radio Frequency Setup menu the allowable limits will be displayed in MHz.

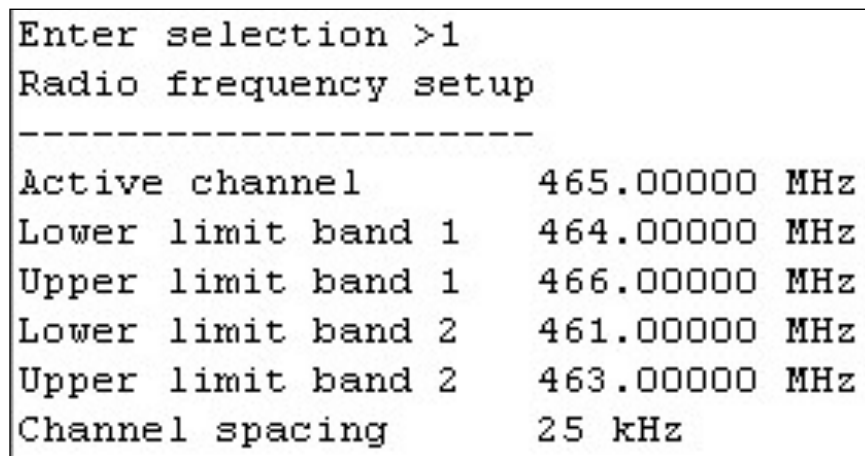


Figure 104: Radio Frequency Band/Channel

4.1.1.9 Enter a new frequency in MHz.

4.1.1.10 Enter ESC to return to the main menu.

```
Enter new frequency (MHz) or ESC to cancel >462.50000

Radio frequency setup
-----
Active channel      462.50000 MHz
Lower limit band 1  464.00000 MHz
Upper limit band 1  466.00000 MHz
Lower limit band 2  461.00000 MHz
Upper limit band 2  463.00000 MHz
Channel spacing     25 kHz

Enter new frequency (MHz) or ESC to cancel >
```

Figure 105: Radio Frequency Setup

4.1.1.11 Notice the radio frequency will now display the frequency entered in the previous step.

```
COM4: 9600 None 8 1 | None | Echo | CR -> CR/LF

***** SATELLINE-3ASd 3069 EPIC 35W *****
SW version 3.35b / HW: EPCc/TC4q + RA13H4047M
-----
Current settings
-----
1) Radio frequency  462.50000 MHz ( CF 463.50000 MHz, spacing 25 kHz )
2) Radio settings   TX power 35 W / Signal threshold -112 dBm / FCS OFF /
                   TX start delay 0ms / Diversity RX OFF / EPIC PWRSave OFF /
                   Compatibility Satel 3AS / Call sign OFF
3) Addressing       RX address OFF / TX address OFF /
                   RX address to RS port OFF / TX address autoswitch OFF
4) Serial port 1    ON / 9600 bit/s / 8 bit data / None parity /
                   1 stop bit
5) Serial port 2    OFF / 9600 bit/s / 8 bit data / None parity /
                   1 stop bit ( RS-232 )
6) Handshaking      CTS Clear to send / CD RSSI-threshold /
                   RTS Ignored / Pause length 3 bytes
7) Additional setup Error correction OFF / Error check OFF / Repeater OFF /
                   SL-commands ON / Priority TX / Full CRC16 check OFF
8) Routing          OFF
9) Tests            OFF
A) Restore factory settings
E) EXIT and save settings
Q) QUIT without saving

Enter selection >|
```

Figure 106: Current Settings/Main Menu

4.1.1.12 Enter selection 2 to adjust the **Radio Setting**.

4.1.1.13 In the **Radio Setup** menu, select option **1** to adjust the transmitting power.

```
Enter selection >2
Radio setup
-----
1) TX power          35 W
2) Signal threshold  -112 dBm
3) TX start delay    0ms
4) Diversity RX      OFF
5) Epic power save   OFF
6) Free Channel Scan RX Slave / OFF
7) View hardware info
8) Radio compatibility Satel 3AS
9) Call sign         OFF

Enter selection or ESC to previous menu >
```

Figure 107: Radio Setup Menu

4.1.1.14 In the **Transmitter Power Setup** menu, select option **1-5** for the required power level. Notice transmission power does not apply to a receiver.

```
Enter selection or ESC to previous menu >1
TX power setup
-----
1) 5 W
2) 10 W
3) 20 W
4) 25 W
5) 35 W

Enter selection or ESC to previous menu >
```

Figure 108: Transmitter Power Setup Menu

4.1.1.15 In the **Radio Setup** menu, select option **8** to change the **Radio Compatibility**.

```
Enter selection or ESC to previous menu >1
Radio setup
-----
1) TX power          5 W
2) Signal threshold  -112 dBm
3) TX start delay    0ms
4) Diversity RX      OFF
5) Epic power save   OFF
6) Free Channel Scan RX Slave / OFF
7) View hardware info
8) Radio compatibility Satel 3AS
9) Call sign         OFF

Enter selection or ESC to previous menu >
```

Figure 109: Radio Setup Menu

4.1.1.16 In the **Radio Compatibility Mode** menu, select “**Option 2**” when communicating APS-3 Internal Radio to Satel Radio (or vice versa). Select “**Satel 3AS**” when communicating Satel Radio to Satel Radio. Do not select “**Option 1.**”

```
Enter selection or ESC to previous menu >8
Radio compatibility Mode
-----
1) Satel 3AS
2) Option 1
3) Option 2

Enter selection or ESC to previous menu >
```

Figure 110: Radio Compatibility Menu

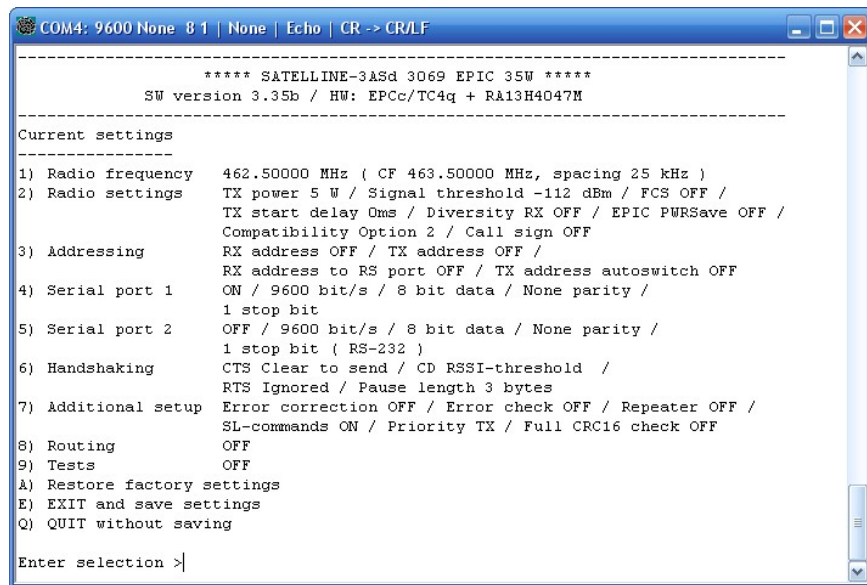
4.1.1.17 Enter **ESC** once Radio Setup is complete.

```
Enter selection or ESC to previous menu >3
Radio setup
-----
1) TX power          5 W
2) Signal threshold -112 dBm
3) TX start delay    0ms
4) Diversity RX      OFF
5) Epic power save   OFF
6) Free Channel Scan RX Slave / OFF
7) View hardware info
8) Radio compatibility Option 2
9) Call sign         OFF

Enter selection or ESC to previous menu >
```

Figure 111: Radio Setup w/ Current Radio settings

4.1.1.18 Entering **ESC** will return display to the main menu, and the new **TX Power** level and **Compatibility Settings** are displayed.



```
COM4: 9600 None 8 1 | None | Echo | CR -> CR/LF

***** SATELLINE-3ASd 3069 EPIC 35W *****
SW version 3.35b / HW: EPCc/TC4q + RA13H4047M

-----
Current settings
-----
1) Radio frequency  462.50000 MHz ( CF 463.50000 MHz, spacing 25 kHz )
2) Radio settings   TX power 5 W / Signal threshold -112 dBm / FCS OFF /
                   TX start delay 0ms / Diversity RX OFF / EPIC PWRSave OFF /
                   Compatibility Option 2 / Call sign OFF
3) Addressing       RX address OFF / TX address OFF /
                   RX address to RS port OFF / TX address autoswitch OFF
4) Serial port 1    ON / 9600 bit/s / 8 bit data / None parity /
                   1 stop bit
5) Serial port 2    OFF / 9600 bit/s / 8 bit data / None parity /
                   1 stop bit ( RS-232 )
6) Handshaking      CTS Clear to send / CD RSSI-threshold /
                   RTS Ignored / Pause length 3 bytes
7) Additional setup Error correction OFF / Error check OFF / Repeater OFF /
                   SL-commands ON / Priority TX / Full CRC16 check OFF
8) Routing          OFF
9) Tests            OFF
A) Restore factory settings
E) EXIT and save settings
Q) QUIT without saving

Enter selection >|
```

Figure 112: Current Settings/Main Menu

4.1.1.19 Select option 4 to adjust Serial Port 1 Settings.

4.1.1.20 In the Serial Port 1 Settings menu, select option 2 to change the Data Speed.

```
Enter selection >4
Serial port 1
Settings
-----
1) Port status      ON
2) Data speed       19200 bit/s
3) Data bits        8 bit data
4) Parity bits      None parity
5) Stop bits        1 stop bit

Enter selection or ESC to previous menu >
```

Figure 113: Serial Port 1 Settings Menu

4.1.1.21 In the Data Speed menu, select 38400 bit/s.

```
Enter selection or ESC to previous menu >2
Serial port 1 data speed
-----
1) 300 bit/s
2) 600 bit/s
3) 1200 bit/s
4) 2400 bit/s
5) 4800 bit/s
6) 9600 bit/s
7) 19200 bit/s
8) 38400 bit/s

Enter selection or ESC to previous menu >
```

Figure 114: Serial Port 1 Data Speed Menu

4.1.1.22 The new data speed will be displayed in the Serial Port 1 Settings Menu. Enter ESC to return to the main menu.

```

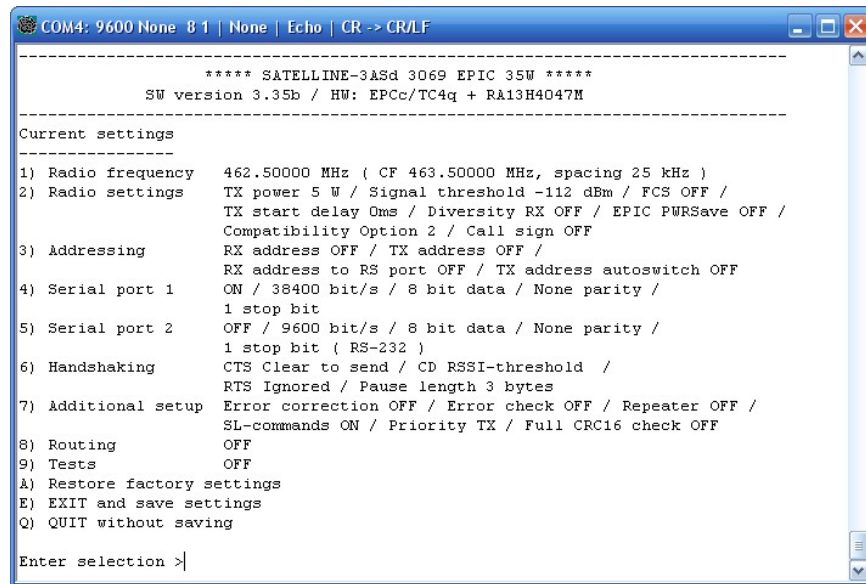
Enter selection or ESC to previous menu >8
Serial port 1
Settings
-----
1) Port status          ON
2) Data speed           38400 bit/s
3) Data bits            8 bit data
4) Parity bits          None parity
5) Stop bits            1 stop bit

Enter selection or ESC to previous menu >

```

Figure 115: Serial Port 1 Current Settings

4.1.1.23 Notice the Serial Port 1 settings have been adjusted in the main menu to illustrate the current settings.



```

COM4: 9600 None 8 1 | None | Echo | CR -> CR/LF

***** SATELLINE-3ASd 3069 EPIC 35W *****
SW version 3.35b / HW: EPCc/TC4g + RA13H4047M

-----
Current settings
-----
1) Radio frequency      462.50000 MHz ( CF 463.50000 MHz, spacing 25 kHz )
2) Radio settings       TX power 5 W / Signal threshold -112 dBm / FCS OFF /
                        TX start delay 0ms / Diversity RX OFF / EPIC PURSave OFF /
                        Compatibility Option 2 / Call sign OFF
3) Addressing           RX address OFF / TX address OFF /
                        RX address to RS port OFF / TX address autoswitch OFF
4) Serial port 1        ON / 38400 bit/s / 8 bit data / None parity /
                        1 stop bit
5) Serial port 2        OFF / 9600 bit/s / 8 bit data / None parity /
                        1 stop bit ( RS-232 )
6) Handshaking          CTS Clear to send / CD RSSI-threshold /
                        RTS Ignored / Pause length 3 bytes
7) Additional setup     Error correction OFF / Error check OFF / Repeater OFF /
                        SL-commands ON / Priority TX / Full CRC16 check OFF
8) Routing              OFF
9) Tests                OFF
A) Restore factory settings
E) EXIT and save settings
Q) QUIT without saving

Enter selection >|

```

Figure 116: Current Settings/Main Menu

4.1.1.24 Enter option **7** to adjust **Additional Setup**.

4.1.1.25 In the **Additional Setup menu**, enter in option **1** to toggle the **Error Corrections** ON

```
Enter selection >7
Additional setup
Toggle ON/OFF values. Current value shown.
-----
1) Error correction    OFF
2) Error check        OFF
3) Repeater           OFF
4) SL-commands        ON
5) Priority            TX
6) Full CRC16 check   OFF

Enter selection or ESC to previous menu >
```

Figure 117: Additional Setup Menu

4.1.1.26 Notice the Error Corrections option has been toggled ON.

4.1.1.27 Enter ESC to return to the main menu.

```
Enter selection or ESC to previous menu >1
Additional setup
Toggle ON/OFF values. Current value shown.
-----
1) Error correction    ON
2) Error check        OFF
3) Repeater           OFF
4) SL-commands        ON
5) Priority            TX
6) Full CRC16 check   OFF

Enter selection or ESC to previous menu >
```

Figure 118: Additional Setup Current Settings

4.1.1.28 Notice the Error Corrections has been adjusted in the Additional setup menu.

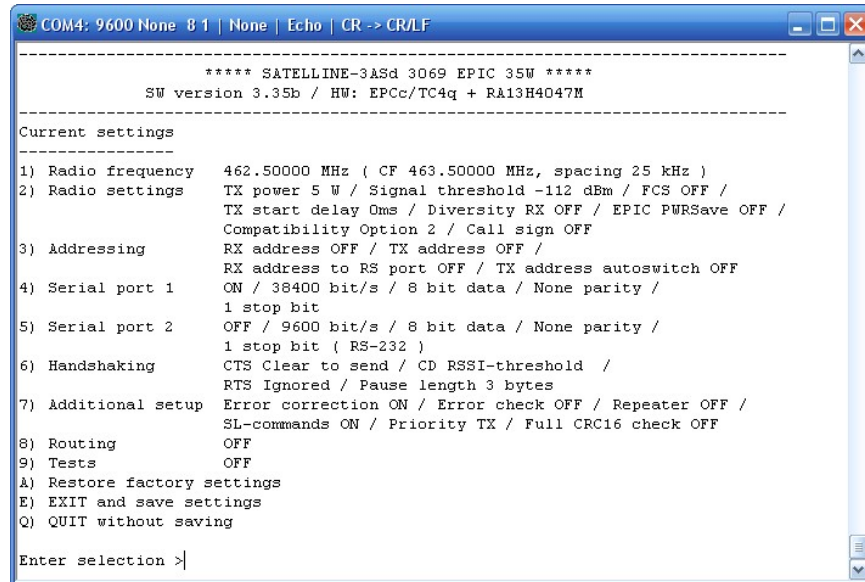


Figure 119: Current Settings/Main Menu

4.1.1.29 Enter option **E** to save settings and exit programming.

4.1.1.30 Turn off programming mode by flipping the **Programming Mode Switch** to the initial position.

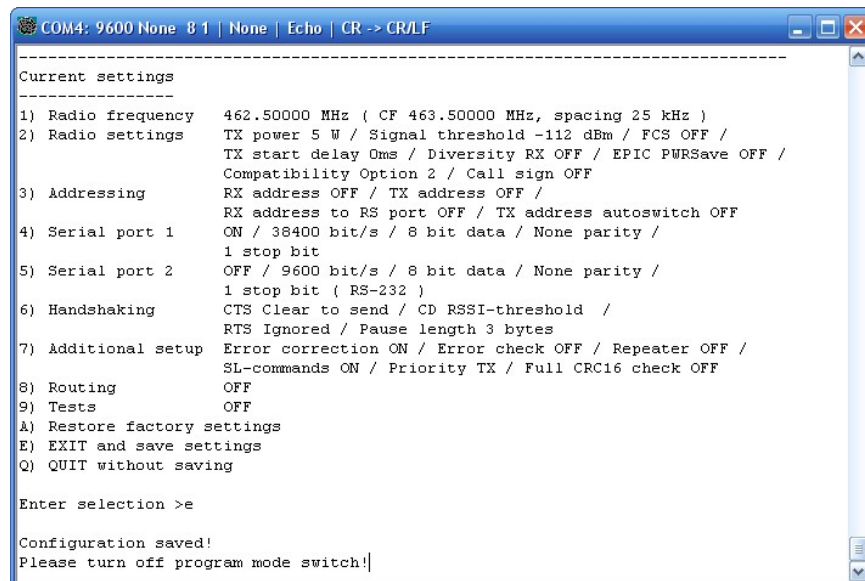


Figure 120: Exit and Save Settings

4.1.1.31 For instructional purposes, switch back to programming mode. Then select option **A** to Restore **Factory (Satel) Settings**.

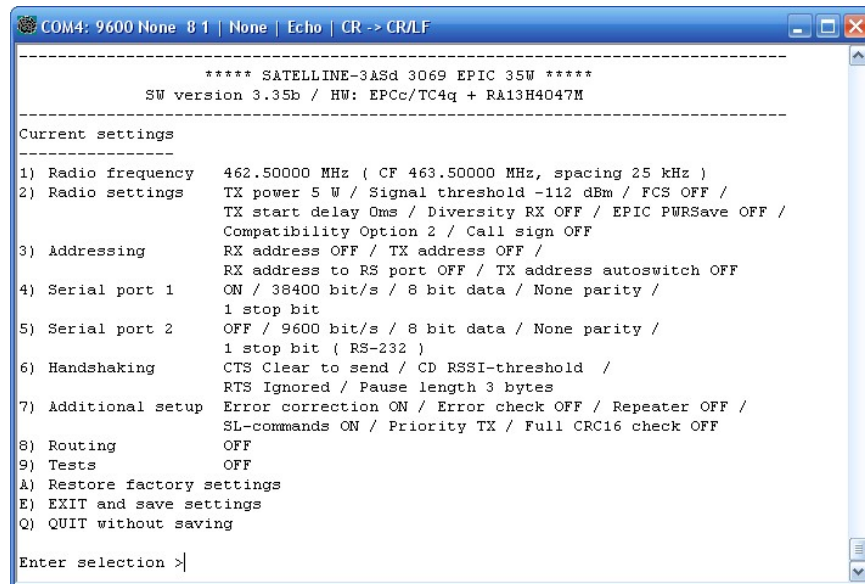


Figure 121: Current Settings/Main Menu

4.1.1.32 Choose **Y** to restore factory settings.

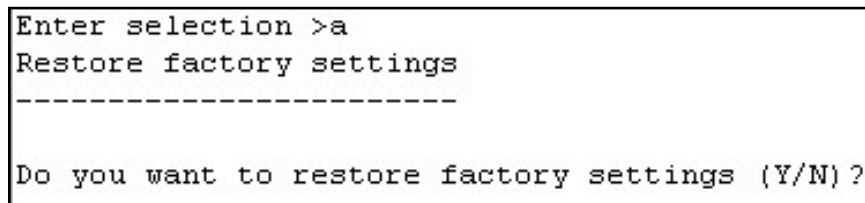
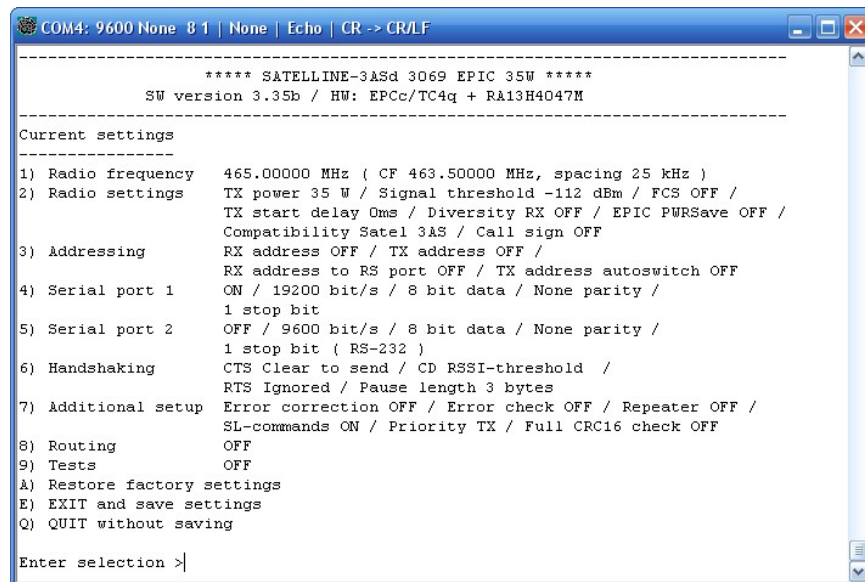


Figure 122: Restore Factory Settings Selection

4.1.1.33 Notice the Factory Settings have been configured. Exit programming mode by either saving and exiting or by quitting without saving.



```
COM4: 9600 None 8 1 | None | Echo | CR -> CR/LF

***** SATELLINE-3ASd 3069 EPIC 35W *****
SW version 3.35b / HW: EPCc/TC4q + RA13H4047M
*****

Current settings
-----
1) Radio frequency  465.00000 MHz ( CF 463.50000 MHz, spacing 25 kHz )
2) Radio settings   TX power 35 W / Signal threshold -112 dBm / FCS OFF /
                   TX start delay 0ms / Diversity RX OFF / EPIC PWRSave OFF /
                   Compatibility Satel 3AS / Call sign OFF
3) Addressing       RX address OFF / TX address OFF /
                   RX address to RS port OFF / TX address autoswitch OFF
4) Serial port 1    ON / 19200 bit/s / 8 bit data / None parity /
                   1 stop bit
5) Serial port 2    OFF / 9600 bit/s / 8 bit data / None parity /
                   1 stop bit ( RS-232 )
6) Handshaking      CTS Clear to send / CD RSSI-threshold /
                   RTS Ignored / Pause length 3 bytes
7) Additional setup Error correction OFF / Error check OFF / Repeater OFF /
                   SL-commands ON / Priority TX / Full CRC16 check OFF
8) Routing          OFF
9) Tests            OFF
A) Restore factory settings
E) EXIT and save settings
Q) QUIT without saving

Enter selection >
```

Figure 123: Factory Settings/Main Menu

4.1.2 Satel Firmware Upgrade

4.1.3 Satel Repeater

4.2 Satel SurvCE Configuration

4.2.1 Configuration to Transmit

4.2.2 Configuration to Receive

4.3 APS-3 SurvCE Configuration For Satel

This configuration is under development – new SurvCE release

4.3.1 Configuration to Transmit

4.3.2 Configuration to Receive

5 Intuicom RTK Bridge

This configuration is under development

5.1 Vendor Configuration

5.1.1 Configuration to Transmit

5.1.2 Configuration to Receive

5.1.3 Intuicom Firmware Upgrade

5.2 Intuicom SurvCE Configuration

5.2.1 Configuration to Transmit

5.2.2 Configuration to Receive

5.3 APS-3 SurvCE Configuration For Intuicom

This configuration is under development – new SurvCE release

5.3.1 Configuration to Transmit

5.3.2 Configuration to Receive

6 Trimtalk Radio

This configuration is under development

6.1 Vendor Configuration

6.1.1 Configuration to Transmit

6.1.2 Configuration to Receive

6.1.3 Trimtalk Firmware Upgrade

6.2 Trimtalk SurvCE Configuration

6.2.1 Configuration to Transmit

6.2.2 Configuration to Receive

6.3 APS-3 SurvCE Configuration For Trimtalk

This configuration is under development – new SurvCE release

6.3.1 Configuration to Transmit

6.3.2 Configuration to Receive

7 Appendix A

		Rover	Base	Rover	Rover	Rover
AWLaunch Tab	Parameter	AW400TX -- AW4XX	AW400TX -- AW4XX	AW400TX -- PacCrest	AW400TX -- SATEL	AW400TX -- Intuicom
Identification	Unit Name	AW400TX	AW400TX	AW400TX	AW400TX	AW400TX
Identification	Unit Number	0	0	0	0	0
Identification	Owner	Blank	Blank	Blank	Blank	Blank
Identification	Call Sign	Inaccessible	Inaccessible	Inaccessible	Inaccessible	Inaccessible
Identification	Serial Number	Same as tagged	Same as tagged	Same as tagged	Same as tagged	Same as tagged
Identification	Firmware Version	Ver X.X Rev XX	Ver X.X Rev XX	Ver X.X Rev XX	Ver X.X Rev XX	Ver X.X Rev XX
Identification	Bootloader Version	Ver X.X Rev XX	Ver X.X Rev XX	Ver X.X Rev XX	Ver X.X Rev XX	Ver X.X Rev XX
Identification	Hardware Version	Ver X.X	Ver X.X	Ver X.X	Ver X.X	Ver X.X
Wireless	Protocol	Remote/Simplex RX	Base/Simplex TX	PCC Receiver/PDL w/EOT	PCC Receiver/PDL w/EOT	PCC Receiver/PDL w/EOT
Wireless	RF Channel	Manual/Ch1 459.550 MHz	Manual/Ch1 459.550 MHz	Manual/Ch1 459.550 MHz	Manual/Ch1 459.550 MHz	Manual/Ch1 459.550 MHz
Wireless	Modulation	DQPSK/19.2 kbps	DQPSK/19.2 kbps	GMSK/9.6 kbps	GMSK/9.6 kbps	GMSK/9.6 kbps
Wireless	RF Power	Inaccessible	30 dbm/1000mW	Inaccessible	Inaccessible	Inaccessible
Wireless	Misc	Scrambling Disabled	Scrambling Disabled	Scrambling Disabled	Scrambling Enabled	Scrambling Enabled
Wireless	Misc	FEC Enabled	FEC Enabled	FEC Enabled	FEC Enabled	FEC Enabled
Serial	Maintenance Port	115200	115200	115200	115200	115200
Serial	Data Port	MP Rate, N, 8, N	MP Rate, N, 8, N	MP Rate, N, 8, N	MP Rate, N, 8, N	MP Rate, N, 8, N
Modem	Sleep Mode	Disabled	Disabled	Disabled	Disabled	Disabled
Modem	Activate By	Inaccessible	Inaccessible	Inaccessible	Inaccessible	Inaccessible
Dealer Configuration	Channel Spacing	25 kHz	25 kHz	25 kHz	25 kHz	25 kHz (currently)
Dealer Configuration	Max Allowable RF Power	30dbm (1000mW)	30dbm (1000mW)	30dbm (1000mW)	30dbm (1000mW)	30dbm (1000mW)
Dealer Configuration	Channel Map	List of frequencies	List of frequencies	List of frequencies	List of frequencies	List of frequencies

Figure 124: APS-3 Radio Settings